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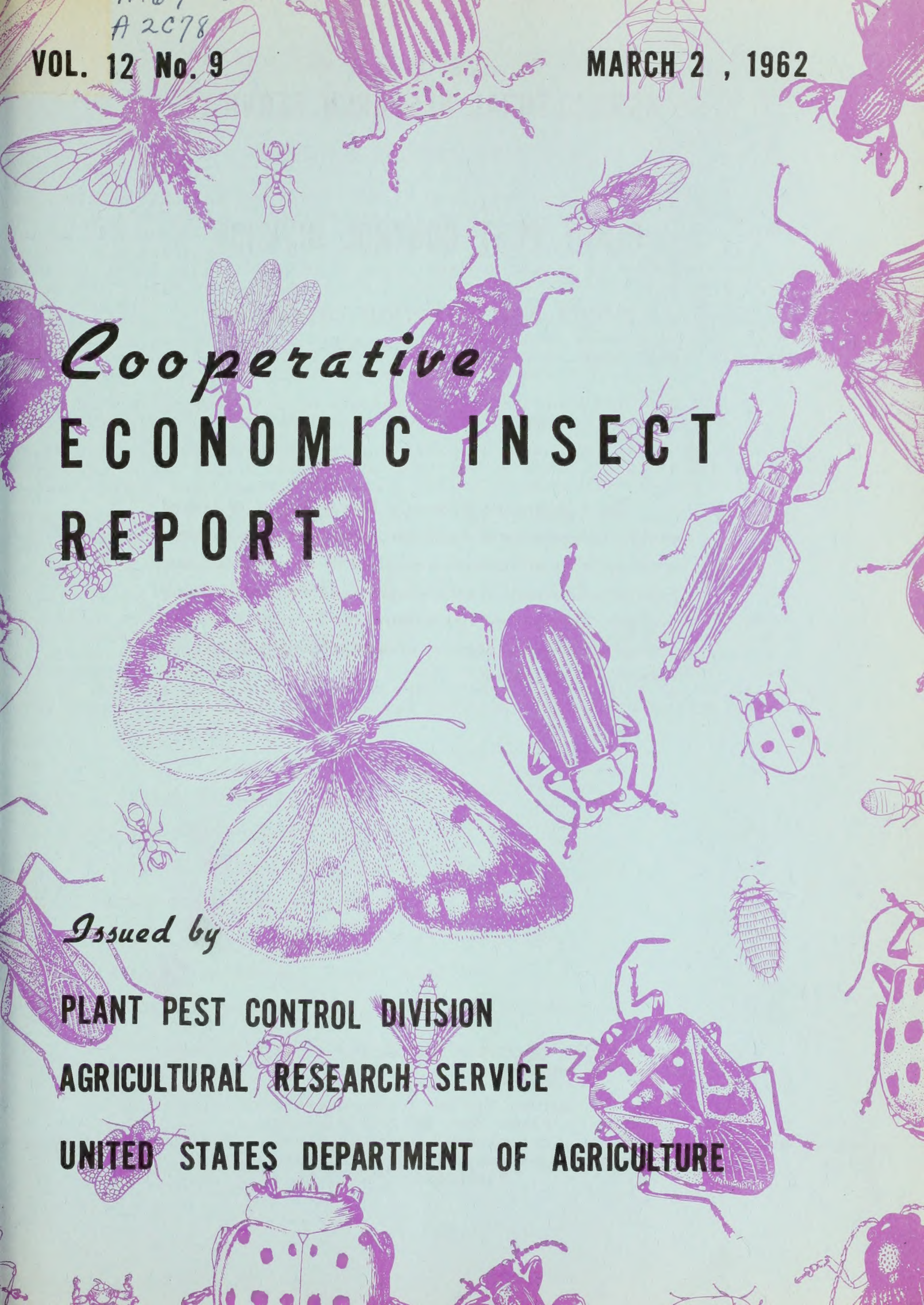

VOL. 12 No. 9

MARCH 2, 1962

Cooperative ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

Reports and inquiries pertaining to this release should be mailed to:

Survey and Detection Operations
Plant Pest Control Division
Agricultural Research Service
United States Department of Agriculture
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Volume 12 March 2, 1962 Number 9

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

ARMY CUTWORM damaging replanted flax in De Witt County, Texas, with controls applied to some fields. Also present in small grains in areas of Oklahoma and Kansas. SUGARCANE BORER mortality high in Louisiana due to severe cold weather; however, favorable conditions in spring and early summer may permit rapid buildup. CRANE FLIES continue to cause serious damage to native pasturelands in central Tulare County, California; larvae range 160-375 per square foot. WHEAT CURL MITE light to moderately severe in Meade and Ford Counties, Kansas; wheat streak mosaic found in some wheat in Meade County. Larval infestations of an alfalfa weevil (Hypera brunneipennis) increased greatly in alfalfa on the Yuma Mesa, Arizona, with 1,000-2,000 per sweep in many fields; defoliation almost complete in heavily infested fields. (p. 113).

CITRUS RUST MITE population in Florida lowest on record for this time of year; CITRUS RED MITE continues at record low level in State. (p. 114).

SPIDER MITES and APHIDS in strawberry fields in Louisiana parishes east of Mississippi River little affected by severe cold winter; populations appear greater than in many years. Immediate control measures recommended. (p. 115).

CHICKEN BODY LOUSE heavy on many flocks in northwestern Arkansas, and NORTHERN FOWL MITE increasing in Washington County, Arkansas. (p. 116).

Forecasts of Insect Conditions

Late hatch of HESSIAN FLY in fall of 1961 poses a potential threat to wheat in north central Kansas for spring of 1962. (p. 135). Indications are that infestations of RANGE CATERPILLAR will be very heavy during the spring of 1962 in Colfax County, New Mexico. (p. 137). Surveys for MEADOW SPITTLEBUG during the fall of 1961, in Ohio, indicate high populations will develop in the spring of 1962, especially in central and eastern counties of that State. (p. 147).

Special Reports

Summary of Insect Conditions - 1961 (continued)

CEREAL AND FORAGE INSECTS - (p. 118)

- Corn and Sorghum Insects - (p. 118).
- Small Grain Insects - (p. 130).
- Range, Pasture and Lawn Insects - (p. 136).
- Flax and Safflower Insects - (p. 139).
- Alfalfa, Clover and Vetch Insects - (p. 139).
- Soybean, Peanut and Field Pea Insects - (p. 156).

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Reports in this issue are for week ending February 23, unless otherwise indicated.

WEATHER BUREAU 30-DAY OUTLOOK

MARCH 1962

The Weather Bureau's 30-day outlook for March calls for temperatures to average below normal over the northern half of the Nation, except for near normal in the Pacific Northwest, New England and the Middle Atlantic States. Above normal temperatures are predicted for the Gulf and South Atlantic States, while near to below normal values are in prospect for the Southwestern quarter of the Nation. This enhanced temperature contrast between north and south is expected to favor the development and rapid progression of numerous storms eastward through the middle of the country, resulting in precipitation in excess of normal from the Continental Divide eastward, except for subnormal amounts in states bordering the Gulf of Mexico. West of the Divide, about normal precipitation is anticipated.

Weather forecast given here is based on the official 30-day "Resume and Outlook", published twice a month by the Weather Bureau. You can subscribe through Superintendent of Documents, Washington 25, D. C. Price $4.80 a year, $2.40 a half year.

WEATHER OF THE WEEK ENDING FEBRUARY 26

The week was unseasonably mild south of a line joining El Paso, Texas, and Philadelphia, Pennsylvania, and abnormally cold elsewhere. There was much cloudiness, with frequent and widespread precipitation which was mostly in the form of snow in northern portions of the country.

The week was extremely cold in the northern Great Plains where gradually falling temperatures averaged as much as 21° below normal. Temperatures never rose above freezing in North Dakota, and adjacent areas and many stations had subzero minima all week. Butte, Montana, reported -35° on the 26th, and the Canadian Border States from North Dakota to New England reported lows of -18° to -29°.

In the Gulf and south Atlantic coastal areas, where temperatures for the week averaged 9° to 12° above normal, maximum temperatures generally ranged in the 70's and 80's. During the closing days of the period, maxima reached the low 90's at a few stations in southern Florida and extreme southern Texas.

Precipitation was heaviest in the southeast Interior, where weekly totals exceeded 2 inches in a large area and ranged up to more than 6 inches in the southern Appalachians. Most of this heavy precipitation fell on Wednesday, Thursday and Friday. Widespread thunderstorm activity occurred over Kentucky and Tennessee and adjacent areas on Friday.

In other areas east of the Great Plains, precipitation generally exceeded 0.50 inch. Amounts were very light to none in much of the lower Great Plains, but were heavier in northern portions. Mountainous areas of the Far West received over 0.50 inch, but amounts were generally light at lower elevations, except for heavy amounts in southern California.

Snowfall during the week slightly increased the snowpack in the Cascade and Sierra Nevada Mountains. In northern areas east of the Continental Divide, frequent light to occasionally heavy snowfall generally increased the snow cover there by several inches. The cover is unusually heavy from the northern Great Plains through the Great Lakes region and the Northeast. Depths range up to nearly 3 feet in Iowa, Minnesota, Wisconsin, Michigan, New York and New England. (Summary supplied by U. S. Weather Bureau).

CEREAL AND FORAGE INSECTS

GREENBUG (Toxoptera graminum) - TEXAS - Continues at noneconomic levels in State, but may possibly begin to build up following several weeks of favorable weather. (Texas Coop. Rpt.). OKLAHOMA - Populations continue to be noneconomic in all areas checked. Almost nonexistent in northeast and north central areas. Averaged one per linear foot in Marshall County and 4-7 per linear foot in Tillman County; up to 12 per linear foot observed on barley in Comanche County. (Okla. Coop. Sur.). KANSAS - Not found during surveys in southern counties of southeast and south central districts. (Peters).

ARMY CUTWORM (Chorizagrotis auxiliaris) - TEXAS - Damaging stands of replanted flax in De Witt County; controls being applied to some fields. (Heideman). Heavy, widespread populations of undetermined cutworms, probably this species, attacking flax in Wilson County. (Texas Coop. Rpt., Prucia). OKLAHOMA - Light, scattered counts of 0-2 per linear foot in small grain in northeast, north central and southwest areas; none found on alfalfa in northeast and north central areas. (Okla. Coop. Sur.). KANSAS - Occasional larva in wheat in Barber and Reno Counties; no damage noted. Counts much less than 1 per foot of row. (Peters).

CORN EARWORM (Heliothis zea) - FLORIDA - Lightly infested 190 acres of sweet corn at Pahokee, Palm Beach County. (W. W. Smith, Feb. 12).

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - OKLAHOMA - Counts of overwintering population in Washington and Mayes Counties showed 80 percent and 70 percent mortality, respectively, in corn stalks. (Okla. Coop. Sur.).

SUGARCANE BORER (Diatraea saccharalis) - LOUISIANA - Severe cold season greatly reduced population; field checks throughout sugarcane-growing area indicate high percentage of mortality. Although survival low, farmers cautioned that favorable conditions of spring and early summer may permit rapid buildup. (Cancienne, Dry, Feb. 19).

CRANE FLIES (Tipula spp.) - CALIFORNIA - Continue to cause serious damage to native pasturelands in Yokohl Valley in foothills of central Tulare County. Estimated 30,000 acres scouted, approximately 8,000 acres received chemical treatment. Counts ranged 160 to 375 larvae per square foot. Rains interfered with treatment and provided favorable conditions for continuing damage. (Cal. Coop. Rpt.).

WINTER GRAIN MITE (Penthaleus major) - TEXAS - Populations continue noneconomic in State. May possibly begin to increase after several weeks of favorable weather. (Texas Coop. Rpt.). OKLAHOMA - Populations, less than 5 per linear foot, found in fields checked in northeast and north central sections; up to 12 per linear foot on wheat in Tillman County. (Okla. Coop. Sur.).

WHEAT CURL MITE (Aceria tulipae) - KANSAS - Very limited surveys made during past few weeks show only trace infestations in central and southwestern areas, except in Meade and Ford Counties where infestations are light to moderately severe. Wheat streak mosaic found in some wheat fields in Meade County. (Somsen).

AN ALFALFA WEEVIL (Hypera brunneipennis) - ARIZONA - Larval infestations increased greatly on alfalfa on the Yuma Mesa, Yuma County; larval counts 1,000-2,000 per sweep in many fields. Foliage damage heavy with almost complete defoliation in heavily infested fields. Fields in Yuma Valley have only light infestations presently. (Ariz. Coop. Sur.).

ALFALFA WEEVIL (Hypera postica) - GEORGIA - Light feeding on alfalfa noted in Oconee County. (Johnson).

SPOTTED CUCUMBER BEETLE (Diabrotica undecimpunctata howardi) - OKLAHOMA - Light to medium, 1-3 per square foot, on alfalfa in southeast area. (Okla.Coop.Sur.).

GREEN CLOVERWORM (Plathypena scabra) - OKLAHOMA - Count of one per square foot noted in field of alfalfa in southeast area. (Okla. Coop. Sur.).

PEA APHID (Macrosiphum pisi) - KANSAS - Several alfalfa fields checked in southeast and south central districts were negative. Roadside embankment in Montgomery County with counts of fewer than 5 aphids per square foot of crown area. (Peters). OKLAHOMA - Light populations noted in scattered fields of overwintering alfalfa in northeast, north central and southeast areas. (Okla. Coop. Sur.). ARIZONA - Infestations increasing in central and southwestern alfalfa, but light in most cases. (Ariz. Coop. Sur.).

SPOTTED ALFALFA APHID (Therioaphis maculata) - KANSAS - Alfalfa fields checked in southeastern and south central areas of State were negative. (Peters). OKLAHOMA - Checks of alfalfa in northeast and north central areas negative. Light, 0.5 per square foot, noted in one field in Choctaw County. (Okla. Coop. Sur.).

TARNISHED PLANT BUG (Lygus lineolaris) - OKLAHOMA - Light on alfalfa in southeast; 0-2 per square foot. (Okla. Coop. Sur.).

FRUIT INSECTS

GRANULATE CUTWORM (Feltia subterranea) - FLORIDA - Infested 15 percent of 6,000 peach trees at Pomona Park, Putnam County. (Graham, Feb. 14).

ITALIAN PEAR SCALE (Epidiaspis piricola) - CALIFORNIA - Medium populations of adults on prune trees in Dairyville, Tehama County. (Cal. Coop. Rpt.).

PECAN CARPENTERWORM (Cossula magnifica) - SOUTH CAROLINA - Very abundant locally in Allendale County; infestation treated. (McLaughlin).

CITRUS RUST MITE (Phyllocoptruta oleivora) - CALIFORNIA - Medium infestation on Rangpur lime in San Diego, San Diego County. (Cal. Coop. Rpt.).

FLORIDA RED SCALE (Chrysomphalus aonidum) - FLORIDA - Severe on sweet orange at Shiloh, Brevard County. (Brewton, Feb. 15).

Citrus Insect Situation in Florida - Mid-February - CITRUS RUST MITE (Phyllocoptruta oleivora) infested 47 percent of groves (norm 65 percent); 32 percent economic (norm 41 percent). Statewide population lowest on record for this time of year. Nevertheless, this important pest is always a problem in some groves. Increase underway but infestations will not exceed average. Highest districts are Bartow, west coast and Brooksville. CITRUS RED MITE (Panonychus citri) infested 24 percent of groves (norm 62 percent); 10 percent economic (norm 32 percent). Population continues at record low level with all districts in the low range; little change expected. TEXAS CITRUS MITE (Eutetranychus banksi) infested 18 percent of groves; 2 percent economic. All districts continue in low range and only slight increase expected. PURPLE SCALE (Lepidosaphes beckii) infested 81 percent of groves (norm 79 percent); 12 percent economic (norm 17 percent). Infestations common but very few have destructive numbers. Highest district is ridge. The norms are the 1959-61 averages for this date. Prior to 1958, when the parasitic eulophid, Aphytis lepidosaphes, was not present, the norms were 93 and 56 percent, respectively, for this date. FLORIDA RED SCALE (Chrysomphalus aonidum) infested 45 percent of groves (norm 47 percent); 5 percent economic (norm 6 percent). Population in low range. It will remain below average level despite a slight upward trend. The overwintering BLACK SCALE (Saissetia oleae) population is still far above normal. SIX-SPOTTED MITE (Eotetranychus sexmaculatus) and APHIDS are scarce at this time. (Simanton, Thompson, Johnson (Citrus Exp. Sta., Lake Alfred)).

TRUCK CROP INSECTS

APHIDS - ARIZONA - Infestations a problem on many crops and home plantings in many areas of the State. (Ariz. Coop. Sur.).

GREEN PEACH APHID (*Myzus persicae*) - ARIZONA - Light to heavy infestations continue on several crops in central and southwestern areas. Very heavy populations present on some weeds. (Ariz. Coop. Sur.).

FLEA BEETLES - NEW MEXICO - Approximately 30 acres of cabbage near Mesquite, Dona Ana County, treated; control good. (N. M. Coop. Rpt.).

SWEETPOTATO WEEVIL (*Cylas formicarius elegantulus*) - FLORIDA - Collected on sweetpotato at Jennings, Hamilton County; det. W. Breidenbach. (Adkins, Feb. 16).

Strawberry Pests in Louisiana - Severe cold winter had little effect on SPIDER MITES and APHIDS in strawberry fields of those parishes east of the Mississippi River. Populations of these two pests appear to be greater than has been experienced in many years. Immediate control measures recommended. (Cancienne, Dry, Feb. 19).

COTTON INSECTS

BOLL WEEVIL (*Anthonomus grandis*) - TEXAS - Two live weevils collected from debris at base of tree in Jayton, Kent County. (Texas Coop. Rpt., Boren).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

BLACK TURPENTINE BEETLE (*Dendroctonus terebrans*) - GEORGIA - Killing large numbers of trees in Jasper County. (Milner, Feb. 15).

APHIDS - ARIZONA - Several different species beginning to increase on flowers and ornamental plantings in the lower elevation areas. (Ariz. Coop. Sur.). CALIFORNIA - Heavy adult populations of *Macrosiphum* sp. on twigs of elm in El Cajon, San Diego County. (Cal. Coop. Rpt.).

AN ARMORED SCALE (*Phenacaspis cockerelli*) - FLORIDA - Severely infested *Magnolia* sp. at Oneco, Manatee County. (Bickner, Feb. 13).

COTTONY-CUSHION SCALE (*Icerya purchasi*) - NEW MEXICO - Heavy infestations on forsythia in Las Cruces area, Dona Ana County. (N. M. Coop. Rpt.).

LEAF CRUMPLER (*Acrobasis indigenella*) - CALIFORNIA - Heavy populations of larvae and pupae on twigs of *Cotoneaster* sp. in Santa Ana, Orange County. (Cal. Coop. Rpt.).

PYRIFORM SCALE (*Protopulvinaria pyriformis*) - FLORIDA - Moderate to severe on capejasmine and Geiger-tree at Merritt Island, Brevard County. (Levan, Feb. 16).

INSECTS AFFECTING MAN AND ANIMALS

CATTLE GRUBS (*Hypoderma* spp.) - SOUTH CAROLINA - Pour-on treatments of a systemic insecticide checked in Spartanburg, Greenwood, Allendale and Clarendon Counties week of February 11. Highest grub populations found on untreated animals in Greenwood County. Of 10 untreated animals, 5 with no grubs, 1 had 3 grubs, 2 had 5 grubs, 1 had 6 grubs and 1 had 16 grubs. These animals bought at feeder-calf sales and came from various herds which may account for difference. Six untreated animals in Spartanburg County checked; 2 had no grubs, 2 had 1 grub each and 1 had 2 grubs. Maximum found in that county was 3 grubs per animal. No grubs found on untreated animals in Clarendon County. (Nettles et al., Feb 20).

GEORGIA - Survey of 61 cattle in Clarke, Wilkes and Lamar Counties for H. lineatum showed 44 cattle infested. Average infestations ranged 1.4-7.6 grubs per animal. (Roberts, Feb. 15). Cattle inspected February 6 in Putnam County had 10-20 percent larval emergence; inspection on February 20 of same herd showed 50-75 percent emergence. (Roberts). OKLAHOMA - H. lineatum decreasing over State. (Okla. Coop. Sur.). UTAH - Hypoderma spp. recently appeared on backs of cattle in Weber County; 4,500 sprayed or dipped to control both grubs and lice. In addition, 1,200 cattle treated with a systemic for grub and lice control. Grubs numerous on backs of cattle in several communities each in Kane, Wayne, Garfield and Beaver Counties. (Knowlton, Boyer).

CATTLE LICE - UTAH - Numerous in number of untreated beef herds in Kane, Piute, Wayne, Garfield and Millard Counties. (Knowlton). OKLAHOMA - Increased in some areas over State. (Okla. Coop. Sur.). TEXAS - Becoming heavy in several eastern counties. (Tex. Coop. Rpt.). SOUTH CAROLINA - Present on a number of untreated animals, especially around tails. Many beef herds have sufficient numbers to justify controls. (Nettles et al., Feb. 20). GEORGIA - Inspection of 45 cattle on February 15 in Wilkes and Lamar Counties negative; 16 cattle in Clarke County had light populations. Bovicola bovis collected February 24 in Whitfield County. (Roberts).

LONE STAR TICK (Amblyomma americanum) - GEORGIA - Light on beef cattle in Appling County. (Hunt, Feb. 14). OKLAHOMA - Light populations appearing on cattle in southeastern area. (Okla. Coop. Sur.).

CHICKEN BODY LOUSE (Menacanthus stramineus) - ARKANSAS - Infestations heavy on many untreated flocks in northwestern area. (Ark. Ins. Sur.).

NORTHERN FOWL MITE (Ornithonyssus sylviarum) - ARKANSAS - Infestations increasing in Washington County. (Ark. Ins. Sur.).

A DERMANYSSID MITE (Dermanyssus sp.) - MISSOURI - Heavy infestation annoyed residents in home in Caruthersville, Pemiscot County; residents were bitten several times. (French).

HOUSEHOLD AND STRUCTURAL INSECTS

HOUSE FLY (Musca domestica) - OKLAHOMA - Some activity noted in Stillwater area, Payne County, with increasing temperatures. (Okla. Coop. Sur.).

COCKROACHES - ARIZONA - Infested several homes in central part of State. (Ariz. Coop. Sur.).

BROWN-BANDED COCKROACH (Supella supellectilium) - UTAH - Distinct increase in occurrence of this species in Ogden, Weber County, and nearby communities for the past two years noted. (Knowlton, Fronk).

ELM LEAF BEETLE (Galerucella xanthomelaena) - OKLAHOMA - Causing concern around homes in Payne and Tulsa Counties as they leave hibernation quarters. (Okla. Coop. Sur.).

BROWN SPIDER BEETLE (Ptinus clavipes) - OKLAHOMA - Caused some concern around homes in Tulsa, Tulsa County, and Enid, Garfield County. (Okla. Coop. Sur.).

SUBTERRANEAN TERMITES (Reticulitermes spp.) - OKLAHOMA - Swarmed in areas around Tulsa, Tulsa County; Chandler, Lincoln County; and Oklahoma City, Oklahoma County. (Okla. Coop. Sur.).

SOUTHERN LYCTUS BEETLE (Lyctus planicollis) - MISSOURI - Emerged from hardwood floor in 12-year-old house in Carthage, Jasper County. Only a few emergence holes observed, but more adults expected to emerge. (Munson).

BLACK-HORNED PINE BORER (Callidium antennatum var. hesperum) - MARYLAND - Adults appeared in a home at Cockeysville, Baltimore County, on February 1. (U. Md., Ent. Dept.).

MISCELLANEOUS INSECTS

A SLUG (Arion ater) - CALIFORNIA - Survey to determine extent of this introduced slug continues in Del Norte County. Additional survey activity planned with possibility of holding action. This species was erroneously reported from the Gasquet area (cf. CEIR 12(6):72, reported as Casquet) Del Norte County. Additional survey now shows that only location of occurrence is in Crescent City area, Del Norte County. (Cal. Coop. Rpt.).

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - FLORIDA - Extensions totaling 350 acres were found in Pasco and Hillsborough Counties. (Fla. Coop. Sur.).

CORRECTIONS

CEIR 12(6):72 - SLUGS AND SNAILS - CALIFORNIA - Delete portion of note concerning Arion ater at Casquet, Del Norte County.

CEIR 12(5):63 - Coccids in California - Aspidiotus ehrhorni heavy on fig... should read heavy on fir trees.

LIGHT TRAP COLLECTIONS

	Agrotis ipsilon	Feltia subterranea	Prodenia ornithogalli
FLORIDA			
Quincy 2/14		8	2
SOUTH CAROLINA			
Charleston 2/12-18	1	19	

Summary of Insect Conditions - 1961 (Continued from page 98)

CEREAL AND FORAGE INSECTS

Corn and Sorghum Insects

Highlights: EUROPEAN CORN BORER was generally lighter than in 1960 in most areas of the country where the pest is known to occur. The second generation was more abundant than the first in most areas. Spread during the year was reported to include 15 counties in 4 states (Alabama, Georgia, Tennessee and North Dakota). The abundance survey that was conducted during the late summer and fall of the year showed larval populations to be higher in only one state, that being Delaware. The average number of borers per 100 plants was 70, compared with 133 in 1960 in the North Central States. Details of the fall abundance survey are reported in CEIR 12(1): 6-14, 12(2):17, 12(4):37. SOUTHWESTERN CORN BORER was serious in corn fields in eastern and southern New Mexico and increased damage was noted in areas of Missouri and Arkansas. CORN EARWORM was generally light on corn and sorghum during the year; particularly on corn in the more Northern States. However, the pest was damaging to corn and sorghum in several of the Southwestern States. FALL ARMYWORM caused some damage to corn in the North Central and Eastern States, but infestations were generally not widespread. BLACK CUTWORM was damaging in Illinois and Missouri and WESTERN BEAN CUTWORM caused economic damage in southwestern Nebraska. CORN ROOTWORMS were of greatest importance in Nebraska during 1961, where they caused considerable damage and yield losses to corn in many areas of the State. They did not cause as much damage as predicted in Kansas and caused only light damage in South Dakota, except in Lyman County, where WESTERN CORN ROOTWORM was severe in August. NORTHERN CORN ROOTWORM caused extensive lodging of corn plants in an area of Wisconsin and damage was more widespread than usual in Ohio. Widespread damage was also noted in Indiana, but losses were low. Larval damage was reported throughout Missouri. CORN LEAF APHID populations were relatively heavy on sorghum plantings in the Southwest in the late summer and fall, and it was by far the most injurious of corn insects in 1961 in Indiana. RUSTY PLUM APHID was also heavy on sorghum in combination with corn leaf aphid in Arizona. CHINCH BUG was reported damaging only in areas of Alabama and Texas. SORGHUM MIDGE was recorded for the first time in Arizona, where it spread into five counties. Infestations were generally light in Arizona, but the pest occurred over most of Texas and caused extensive damage in spotted areas. Damage by GARDEN SYMPHYLAN to corn seedlings was extensive in Yamhill County, Oregon.

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EUROPEAN CORN BORER (Ostrinia nubilalis) adults were in flight in the Orono area of Penobscot County, MAINE, on June 24. Light infestations and damage to sweet corn occurred in mid-August in Cape Elizabeth area of Cumberland County and infestations and damage were heavy in South Paris, Oxford County. On August 10, randomly sampled ears in a planting in South Paris showed over 80 percent infestation. Populations were at a normal level in VERMONT throughout the year and moderately abundant in NEW HAMPSHIRE. Unusually mild fall temperatures favored development of the second-brood larvae in New Hampshire and moderately high populations are expected to overwinter in untreated fields. The infestations in PENNSYLVANIA were slightly less than in 1960, and, in some cases, damage was masked by excellent growing weather. In NEW JERSEY, Europen corn borer infestations on field corn were low until late summer when a slight buildup occurred. Both generations were abundant on sweet corn in the State. First-generation larvae caused from moderate to heavy damage to early planted field and sweet corn in MARYLAND, particularly on the Eastern Shore. Infestations in midseason corn were light in the State, but second-generation borers were prevalent in ears and stalks in most sections by early September. The fall abundance survey showed the State average to be 115 per 100 plants, one of the highest on record; borers were heaviest in the Eastern Shore district of Maryland where the average was 186 per 100 plants.

European corn borer pupation began by March 25 in DELAWARE and had exceeded 80 percent by May 13 in all areas. Egg masses were found on several crops during the second week of May and, by mid-June, infestations in early corn and wheat were common, particularly in Kent and Sussex Counties. Pupation of the first-generation larvae in corn and potatoes was underway by the last week of June and nearly completed by the second week of July, accompanied by sharp increases of adults in blacklight trap collections. Infestations in corn by succeeding generations in Delaware were very high, a large increase over 1960, especially in Kent and New Castle Counties. The spring survival rate was 121 borers per 100 stalks, a rather high figure; and the average number of borers per 100 plants found during the fall abundance survey was 376, the second highest borer population ever recorded in the State. In VIRGINIA, the infestation of this pest in corn was considerably less than in the two previous years. A fall abundance survey in 4 southwestern and 4 northern counties showed the average number of borers per 100 plants to be less than in 1960. On the Eastern Shore of Virginia, damage was noted in some areas in June. Light trap catches of moths were consistently low, the lowest observed during the past 5 years. The largest numbers were caught in late July. The first generation was not commercially important in CONNECTICUT, but the second generation was very heavy.

European corn borer infestations in corn were found for the first time in the following GEORGIA counties: Dade, Pickens, Bartow, Polk, Cobb, Catoosa, Gordon, Cherokee, Paulding, Haralson, Troup, Butts and Putnam. Infestations were general and light in these counties. In ALABAMA, the spread of the pest continued southward, with infestations being found in Chambers, Coosa and Macon Counties.

The extensive European corn borer survival survey conducted annually in the spring in Van Wert County, OHIO, revealed a winter mortality of 83 percent. Spring cultural operations caused an 85 percent mortality of those larvae which survived the winter. Cool, wet weather in late April and early May delayed planting in Ohio, and this combination of factors had an adverse effect on the first generation. The midsummer population was low (611 larvae per acre) and corresponding damage was slight. In the fall, the population rose to 5,430 larvae per acre, almost a nine-fold increase over the midsummer population. The first egg masses were found in central Ohio on June 5 and, by June 6, pupation was complete in this area on early sweet corn where infestations of up to 42 percent were recorded. Emergence of the first-generation adults peaked at Wooster between July 1 and 3. The fall abundance survey conducted in 33 western Ohio counties indicated an average of only 15.1 larvae (based on an average of all stops) per 100 plants, the lowest the fall population has been since the insect covered the State in 1938. In MICHIGAN, European corn borer was of little consequence on field corn.

The infestation of European corn borer in INDIANA was heaviest in the extreme southern fourth of the State. The northern half of the State showed high reductions in populations. The State average number of borers per 100 plants dropped to about half the average of 1960 when the fall survey was made. The State loss in 1961 was estimated at about one percent. In ILLINOIS, approximately 73 percent of the borers survived the winter of 1960-61. By May 29, 4 percent of the moths had emerged in the southern area and, by June 15, egg laying had started throughout the State. At this time, mites and lady beetle adults were commonly observed feeding on the egg masses. Cool weather at this time retarded borer development for about 2 weeks and this caused the last of the moths to emerge later than usual. Therefore, egg laying was spread over a long period of time in Illinois. Many borers from these late eggs apparently never pupated, but continued through the season to overwinter as larvae. The first-generation surveys made in the northern two-thirds of Illinois showed a decrease from 9 larvae per 100 plants in 1960 to 3 per 100 plants in 1961. The second-generation larval population was much lighter than in 1960. About 30,000 acres were treated to control first-generation borers and 13,000 acres to control second-generation borers.

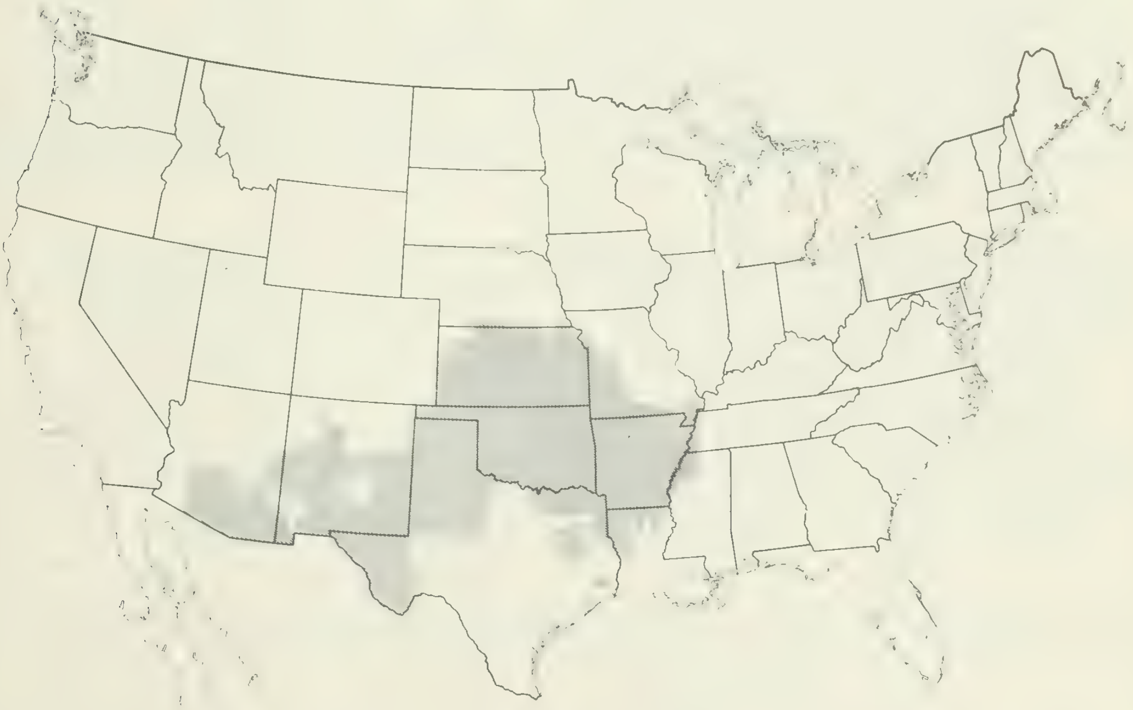
Populations of European corn borer were low during the season in WISCONSIN. Pupation began during the last week of May in Kenosha County and adults began to appear in blacklight traps during the first week of June. Egg masses were noted the following week at Spring Green and Prairie du Chien at the rate of one per 50 plants and 4 per 50 plants, respectively. Eggs of the second generation began hatching near Arlington on August 15. Some ear infestations were present, but less than in 1960. In MINNESOTA, the overwintering mortality survey that was conducted in the spring showed the survival to be 82 percent. Pupation of overwintering borers was first observed during the last week of May and emergence and egg laying first took place in mid-June, but extended over many weeks. Normally, emergence and egg laying does not extend over such a long period of time. Peak egg laying in the southern Minneosta counties occurred during the first week of July. The first generation was relatively heavy in the southwestern and west central districts of the State and moderate to light in other districts as was expected from the 1960 fall survey. The second-generation adult emergence started during the second week in August and extended into September. Moderate to heavy populations of second-generation borers were present in the south central and southwestern districts. A high percentage of these borers was found infesting the ear. In many fields in the south central and southwest districts, 100 percent of the ears was infested. During the fall survey, population decreases were recorded in the southwest, west central, central and east central districts; however, there were still enough borers going into hibernation to provide a potentially damaging population in 1962, especially in the southwestern and west central districts. The northwest district, although not a major corn-growing area in Minnesota, was surveyed in the fall of 1961. The district has experienced relatively high populations of the pest during the last few years.

The fall survey for European corn borer in NORTH DAKOTA showed 84 percent of the plants infested and 262 borers per 100 plants in Cass and Richland Counties. This population, although threatening, is about one-half that recorded for this area in 1960. Mortality of 1960 overwintering borers was estimated at 38.5 percent. Pupation appeared near completion on June 23, and first and second instars were collected on that date. Moth emergence and egg counts in late June indicated a heavy first generation. Egg deposition reached a peak the week of July 10. Drought conditions during June in North Dakota appeared to hamper moth emergence and cold, damp weather the first weeks of July interfered with moth flights. The major egg hatch occurred the week of July 17. Following surveys to determine the infestation levels showed first-generation infestations less severe than anticipated earlier. The number of plants infested ranged from a trace to 80 percent, with the average 38 percent. Population counts averaged 76 borers per 100 plants. Observations indicated a partial second-generation infestation in 1961, which may account for the sharp rise of infested plants shown by the fall survey. The last important second generation occurred in 1949. The fall borer development in general averaged in the fifth instar. Borers in this stage should overwinter in sufficient numbers to provide a reservoir for 1962. In SOUTH DAKOTA, the spring survival survey indicated a 65 percent larval survival in the main corn-growing areas of the State. Pupation began the first week in June in the southeast. The first-generation populations were moderate in the southern areas to light in the northern areas. Second-generation larval populations were high in the southern districts to moderate in the northern districts. The fall survey indicated a fewer number of borers per 100 plants than in 1960. The average was 103 in 1961 compared with 172 in 1960.

The intensive European corn borer spring survival survey in Cuming and Hall Counties, NEBRASKA, showed an average winter mortality of 91.4 and 95.1 percent, respectively. The number of borers per acre was 2,470 in Cuming County and 1,582 in Hall County. Peak moth flights occurred the second and third weeks of June and the first two weeks in August. Egg masses were readily found at these times; however, a noticeable decrease in activity was observed in the second generation. The intensive summer survey in Cuming and Hall Counties showed 3,829 and 4,249 borers per acre, respectively. The statewide fall hibernation survey, which was made in 72 counties, showed the percent of infested plants to range from 0 to 100 and the number of borers per 100 plants to range from 0 to 329. This fall count was approximately one-half the population and percent infestation of the 1960 survey which averaged 56 borers per 100 plants and 38 percent of the plants infested. In MISSOURI, pupation of overwintering larvae was complete and emergence of adults nearly complete in the southeastern area by the last week of May. The adult flight peaked in the central and northern areas by mid-June. During late June and early July, infestations ranging from 5 to 95 percent of the plants showing feeding scars, were observed in the central and northwestern areas of the State. By early July, 5 to 10 percent of the larvae had entered the stalks and controls were considerably less effective. During the last week of July, 10 to 25 pupae and full-grown larvae per 100 plants were observed in the central and north central areas of Missouri. In the southeast area, during the last week of July, first, second and third instars of the second generation could be found. The results of the fall survey showed that the percent infestations was up from 36 in 1960 to 37.1 in 1961, and the larvae per 100 plants was down from 61 in 1960 to 38 in 1961.

European corn borer populations were at the lowest level noted for several years in KANSAS and populations continued at a noneconomic level in infested fields in OKLAHOMA. In ARKANSAS, the percentage of infested stalks and the number of overwintering larvae were lower than in 1960. Very late-planted corn in the northern area was not heavily infested. Only a partial third generation occurred in Arkansas. The European corn borer survey that was conducted in WYOMING, by the Wyoming State Department of Agriculture, revealed no infestations present. This was the second consecutive year that surveys have failed to find the pest in the State. A survey for the pest in NEW MEXICO was also negative.

Distribution of Southwestern Corn Borer



SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) was a serious problem in corn fields in eastern and southern NEW MEXICO during the year. Many farmers refrained from planting corn because of this pest. The first moth collection of the year in ARIZONA occurred the last week of April in a light trap at Mesa. Damage from infestations in corn and sorghum during the summer months in Arizona was slight in most cases. The heaviest infestations occurred during September, when 20 to 40 percent of the stalks was infested in some central area fields. The pest does not occur in Yuma County, Arizona. Southwestern corn borer was reported as a pest in OKLAHOMA and was of economic importance only in a few fields in southern KANSAS. In ARKANSAS, the percentage of stalks lodged due to this pest was nearly double that of 1960, amounting to 10.9 percent compared with 5.8 percent in 1960. Some of this increased lodging is apparently due to the fact that there was very little early corn, which is generally very lightly infested. In northern Arkansas, very late-planted corn was not heavily infested and a third generation did not appear. Larvae and larval damage were found in the following MISSOURI counties for the first time in 1961: Howell, New Madrid, Pemiscot and Stoddard. Heavy infestations were again observed in late-planted fields in extreme southwestern Missouri and some heavy (up to 35 percent of the stalks girdled) damage was evident in a few fields in the southeastern area of the State. (See map on preceding page).

SUGARCANE BORER (Diatraea saccharalis) attacked grain sorghum in moderate to heavy numbers in Brazos and Burleson Counties, TEXAS. Heavy infestations of LESSER CORNSTALK BORER (Elasmopalpus lignosellus) began damaging young sorghum and corn in late June in ARIZONA and continued a problem throughout July and August. Late-planted fields which were not treated, in Arizona, had large areas 100 percent infested in some cases.

Scattered infestations of STALK BORER (Papaipema nebris) were present in corn in eastern NEBRASKA through July, and the pest was found in southeast, south central and central districts of MINNESOTA where it lightly infested marginal rows of corn. In ILLINOIS, stalk borer moved into corn fields from newly mowed roadsides in the central third of the State in June and destroyed up to 31 percent of the corn plants in the first two marginal rows in some fields. Infestations of stalk borer remained at the 1960 level in INDIANA. Larval damage in that State was observed in early planted corn, but infestations were more common along weedy fencerows. Occasional reports of damage to corn were received in VIRGINIA. STALK BORERS (Papaipema spp.) were found in many areas of MAINE on corn; infestations and damage were light. COTTON SQUARE BORER (Strymon melinus) caused light damage to sorghum heads in east central TEXAS.

CORN EARWORM (Heliothis zea) was at a low population level throughout NEW HAMPSHIRE and exceptionally low in VERMONT. Infestations of the pest became very evident in mid-August in CONNECTICUT. Infestations on hybrid seed corn in NEW JERSEY were the lowest on record. In field corn in that State, 96 percent or better, of the ears, were free of insect injury at harvest. Moderate numbers of corn earworm were present in sweet corn late in the season in New Jersey. For the second straight year in MARYLAND, ear infestations by corn earworm in early and late corn were about normal. Again the usual pattern of seasonal abundance existed; that is, moderate to heavy in early planted corn, light in mid-season corn and heavy in late corn. In VIRGINIA, damage to corn was statewide. Medium infestations were reported for areas in Sussex and Charles City Counties and light, local infestations were reported in Chesterfield and Northumberland Counties. The late planting of corn, and above-average rainfall in the summer, probably accounts for the decreased severity of infestations in Virginia. The first moth was taken in the light trap on the Eastern Shore on May 8. Approximately 70 percent of the earliest sweet corn was infested, and corn maturing about July 15 was found to be about 30 percent infested. The latter figure was less than normal.

Corn earworm was practically absent at Wooster and Columbus, OHIO, and present only in moderate numbers at Marietta on sweet corn. On late sweet corn in Ohio, infestations were around 90 to 100 percent at both Marietta and Wooster. However, the pest was infrequently encountered on field corn at harvest. In INDIANA, corn earworm populations declined in 1961. The southern half of the State had the heaviest infestations, with a gradual decline northward where practically no losses were evident. It was mid-September before the corn earworm infested sweet corn in Tippecanoe County; infestations became momentarily high. The average State loss of field corn in Indiana was 0.31 percent in 1961 compared with 0.59 in 1960. This situation was corroborated by light trap catches in which moths of this species were the lowest of the past 5 years. Populations were generally low during the season in WISCONSIN; the first corn earworm collection of the season was verified from a blacklight trap at Cambria during the fourth week of August. Significant numbers of the pest began to appear during the first week of September, which is about a week later than in 1960. Only very late-planted fields of sweet corn were slightly infested with corn earworm in Wisconsin and damage to field corn was practically nonexistent in that State. Adults continued to be caught late in the season, but damage was minimal. The population of corn earworm was extremely low in MINNESOTA. Out of 345 fields checked during the European corn borer fall survey, only 3 were found lightly infested.

Corn earworm fed in whorls of late-planted, scattered corn fields in the southwest and southeastern areas of MISSOURI from early to mid-July. Most of these infestations were light (0.5 to 5 percent of the plants infested), but some ran as high as 15 percent of the plants infested. In SOUTH DAKOTA, samples examined from the eastern part of the State indicated that the 1961 growing season experienced one of the lightest infestations for many years. In over 1,000 ears examined from the southeastern and east central area corn, only 4 ears showed evidence of larval damage. Very light infestations occurred throughout NEBRASKA in 1961. Corn earworm adults were first picked up in light traps the second week in August and peak flights occurred in mid-October. Corn earworm damage to corn and sorghum in KANSAS was at a relatively low level during the year. Corn earworm caused some localized damage to young corn plants in eastern OKLAHOMA by late May. Infestations remained light in corn and sorghum until early July. By mid-July, up to 100 percent (range 50-100 percent) infestation was noted in some corn fields in the north central, northeast, east central, southeast and south central areas of Oklahoma. Lighter infestations (32 percent) were observed in the southwest. Counts ranged from 0-28 in the south central area to 3 per head in Payne County in grain sorghum. Infestations of corn earworm were up considerably in corn over the 1960 season in Oklahoma. In ARKANSAS, few, if any, economic infestations of corn earworm developed on sorghum, although this insect is generally considered to be the most important pest of sorghum in the State. Corn earworm caused spotted damage to grain sorghum in TEXAS.

Corn earworm damaged sweet and field corn throughout NEW MEXICO. Almost 100 percent of the ears was infested in fields checked in the southern half of the State. In ARIZONA, light infestations of corn earworm began to appear in field and sweet corn as budworms in April. During May, June and July, some fields of young corn and sorghum had 50 percent of the stalks infested with one or more larvae. Consistent control measures were necessary in commercial sweet corn after silking began. The pest caused light damage to sweet and field corn in northern UTAH, being damaging in southern Utah. Estimated damage in the State was $90,000. Populations usually were light on early market and canning corn, especially in northern and central canning areas of Utah. Corn earworm was present on corn in COLORADO during the season, but generally very light. The pest caused very little loss; in fact, less than in any one year that the survey program has been in operation.

Corn earworm populations in IDAHO were generally below those encountered in 1960. Generally, about 4 percent of the silks of sweet corn in Canyon County were infested in early August, with a considerable increase in infestations noted by mid-August in the same area. Some severe corn earworm damage was noted, but confined mostly to late-planted sweet corn in the southwestern area of the State. In WASHINGTON, the pest was abundant in the Walla Walla area, but not as damaging as elsewhere on sweet corn. It was abundant and destructive in the Yakima Valley. Larvae started feeding in tassels of early market corn by mid-June because of high temperatures. Adult populations built up rapidly, but did not reach the levels of previous peak years. Corn earworm adults first appeared in OREGON in Jefferson County on June 3. In Umatilla County, all stages were present in fields, with corn foliage being attacked July 1. Infestations were severe to harvest. Corn earworm populations were low in the Willamette Valley, with the first adults being collected on June 24. Infestations were below 10 percent, even in late-maturing fields of corn. Corn earworm infestations in southern NEVADA were as severe as in previous years; but, in the central and northern counties of the State, infestations were lighter than for several years. Infestations were heavy on sweet corn in Lincoln County. Populations were general in CALIFORNIA.

FALL ARMYWORM (Laphygma frugiperda) was a problem on corn and sorghum in some areas of ARIZONA, but generally of minor importance. The pest caused limited damage in isolated areas of TEXAS to sorghum buds and whorls. Infestations in ARKANSAS were much lighter than in 1960. The pest was observed feeding on corn and grain sorghum in MISSOURI, but was not of economic importance in KANSAS. In ILLINOIS, fall armyworm infested corn fields throughout the State in August. The west-southwest district of the State was most heavily populated; 7-24 percent of the plants in late corn fields was infested, with 3 to 72 larvae per 100 plants in this district. Ragging of leaves was apparent in some fields. The fall armyworm appearance of August 1 was the earliest record to date in Tippecanoe County, INDIANA, although few larval infestations were observed or reported in the northern half of the State. An estimate in the southern area of Indiana was difficult because of similar corn earworm damage in the usual area of trouble. Light trap collections of fall armyworm, however, indicated that the moths were more abundant than usual in Indiana. In OHIO, scattered damage to late-planted field corn and sweet corn was observed in late August. Fall armyworm destroyed 50 percent of a cornfield in Franklin County, PENNSYLVANIA, in August, and was reported in occasional numbers elsewhere in the State. Moderate numbers of the insect were present on sweet corn in NEW JERSEY late in the season, and infestations in late corn were spotty in MARYLAND, the heaviest noted approaching 50 percent on silage corn in Frederick County during August. Fall armyworm was seldom reported in VIRGINIA, and in RHODE ISLAND, a small infestation was noted in field corn in the Middletown area of Newport County in late August. Infestations of fall armyworm in millet and grain sorghum in GEORGIA were lighter than in 1960.

ARMYWORM (Pseudaletia unipuncta) infestations were common in grain sorghum in several areas of OKLAHOMA by early September, and marginal rows of corn were lightly infested in some fields in southeastern and south central MINNESOTA. In VIRGINIA, light, local infestations occurred on corn, with the only heavy infestation being reported in Isle of Wight County where several acres of young corn were destroyed.

CUTWORMS, mainly BLACK CUTWORM (Agrotis ipsilon) became noticeable in corn fields in late May in ILLINOIS and continued damaging to corn plants through the middle of June. Some damage occurred in every district in the State. An estimated 92,699 acres were treated and 71,586 acres were replanted. In MISSOURI, several species of cutworms, mainly black cutworm and DINGY CUTWORM (Feltia subgothica) caused some damage to marginal rows of corn and sorghum, with an occasional field requiring replanting. Most cutworm infestations in Missouri were confined to the Missouri River bottoms, with a few isolated infestations in the southwest area. Several species of cutworms were a problem in ARIZONA on corn and sorghum in some areas, but were generally only of minor importance. Populations of cutworms in INDIANA were low due to climatic conditions which did not favor them in 1961. DARK-SIDED CUTWORM (Euxoa messoria) caused damage to corn in the panhandle area of NEBRASKA during the first week of June.

WESTERN BEAN CUTWORM (Loxagrotis albicosta) was in outbreak proportions on corn for the second consecutive year in southwestern NEBRASKA. Egg masses in late July were as high as 300 per 100 plants and, in some fields, 100 percent of the plants was infested. In August, from 3 to 18 larvae were counted per corn plant in this area of the State. Damage to corn ears occurred as far east as Buffalo and Harlan Counties. Peak moth flights occurred from mid-July to mid-August. Over 4,000 moths were collected in a light trap near Parks on the nights of July 19 and 23.

A SKIPPER (Lerodea eufala) was present as a light infestation on corn, sorghum and Sudan grass in Clark County, NEVADA; a new State record.

Limited infestations of SORGHUM WEBWORM (Celama sorghiella) were noted on grain sorghum in August in the southeast and south central areas of OKLAHOMA, but increased to 15 per head in the south central area of the State by late August. By early September, infestations in Oklahoma were becoming increasingly common, but remained light except for localized infestations of 10 to 15 per head in the south central area in mid-September. Checks in late September after heavy rains in the south central area were negative. In TEXAS, damage by sorghum webworm ranged from light to heavy on grain sorghum and Indiangrass. Light populations of this species and corn earworm were observed feeding in heads of grain sorghum in the southwest and southeastern areas of MISSOURI during the latter part of August. In ARKANSAS, few, if any, economic infestations developed on sorghum. This insect is generally considered a close second in importance to corn earworm on sorghum in Arkansas.

A WEBWORM (Crambus sp.) caused severe damage to a few fields of corn in the northern one-third of ILLINOIS in late May, and CORN ROOT WEBWORM (Crambus caliginosellus) was observed feeding on corn and grain sorghum during the year in MISSOURI. The latter species was also reported light and local in Pittsylvania County, VIRGINIA. GARDEN WEBWORM (Loxostege similalis) was observed feeding on grain sorghum and corn during the year in MISSOURI.

CORN ROOTWORMS (Diabrotica spp.) were of the greatest importance in NEBRASKA in 1961. They caused considerable damage and yield losses to corn in many areas of the State. Three species, WESTERN CORN ROOTWORM (Diabrotica virgifera), NORTHERN CORN ROOTWORM (D. longicornis), and SOUTHERN CORN ROOTWORM (D. undecimpunctata howardi) were present in the State. This was the second consecutive year that soil insecticide treatments did not give satisfactory control in the south central area. In this area, western corn rootworm accounted for approximately 100 percent of the rootworm populations. The northern corn rootworm was dominant in the extreme east and northeast parts of Nebraska, whereas the southern corn rootworm was few in number and scattered throughout the State. The first larval damage occurred in mid-June and continued through July. Larval counts ranged from one to 165 per corn plant. The first adult emergence was noted in mid-July. Egg deposition occurred from mid-August on. At this time, considerable adult feeding was found on the kernels at the tip of corn ears. Adults of all three of the aforementioned species were observed feeding on legumes and sorghum in near proximity to corn in Nebraska. In KANSAS, northern corn rootwestern corn rootworm and southern corn rootworm did not cause as much lodging of corn plants as had been predicted. This was due largely to the extensive amount of soil treated and planting on clean ground.

A severe western corn rootworm infestation occurred in Lyman County, SOUTH DAKOTA. The infestation was first reported by the county agent the first week of August. Approximately 2 sections were affected, with some corn so severely damaged that it had to be plowed under. Light infestations of southern corn rootworm and northern corn rootworm were also reported in the southeast, east central and central areas of South Dakota during August. These infestations were widely scattered and only individual fields were affected. The damage in these fields consisted of goosenecked stalks along with some adult feeding on the ears. In ILLINOIS, northern corn rootworm and southern corn rootworm populations were generally light. In late July, 0 to 20 percent (average 4) of the corn plants showed some degree of lodging.

Northern corn rootworm adults were first observed in WISCONSIN, near Arlington, on July 21. Extensive lodging of corn plants in this area, due to the feeding of the larvae, occurred on July 24. Adults of the species became very abundant in northern Dane and Columbia Counties during the first part of August and were noted as far north as Ellsworth in Pierce County. In MISSOURI, larval damage by northern corn rootworm was reported in scattered corn fields throughout the State. Widespread damage was not observed in one area. Very little damage to the ears by adult feeding was evident. The pest was generally distributed in INDIANA during 1961 and in greater numbers than usual. Losses were low but widespread. The feeding by northern corn rootworm adults on corn silks in one field in Randolph County reduced pollination and caused a 50 percent reduction in yield. Both adult feeding on silks and larval feeding on roots causes serious damage to field corn in several northwestern OHIO counties. Northern corn rootworm adults were found in 9 of 10 fields surveyed in Fulton County, Ohio, during August. Ears with adults, in infested fields, ranged from 6 to 96 percent (average 48). Severe damage by adults of this species was also observed in Seneca, Henry and Sandusky Counties. Evidence of damage to corn roots by larvae was more evident and widespread than usual in Ohio. Lodging was conspicuous at harvest, especially in the northwestern area.

Western corn rootworm was recorded for the first time in MINNESOTA during 1961, in Pipestone and Rock Counties, on alfalfa and corn. Surveys for the pest in northwest MISSOURI were negative. In WYOMING, western corn rootworm adults were first reported on July 20 in Platte County and the heaviest infestations were reported about the middle of August. In general, the populations in Wyoming were not as great as those found in 1960. The largest populations were found in areas of Platte County. The pest caused the main losses to field corn in areas of COLORADO where no crop rotation has been followed. However, the total losses to this crop by insects in Colorado was less than one percent. WESTERN SPOTTED CUCUMBER BEETLE (Diabrotica undecimpunctata undecimpunctata) damaged tasseling corn in Washington County, OREGON, from August 1 through harvest.

SEED-CORN BEETLE (Agonderus lecontei) adult activity was common in the eastern area of NEBRASKA, with large numbers being collected in the Lincoln light trap in early June. The insect was not of economic importance in KANSAS. A CHRYSOMELID (Maecolaspis sp.) was rather light on corn in ILLINOIS, but adults of a species were abundant on corn in Frederick and Queen Annes Counties, MARYLAND, during late July; damage in the latter State was negligible, however.

CORN FLEA BEETLE (Chaetocnema pulicaria) populations were above normal in MARYLAND, being most abundant on sweet and field corn during August. High numbers were present on sweet corn in NEW JERSEY, but only occasional reports of damage were received in VIRGINIA. The pest was not commercially important on corn in CONNECTICUT. Populations of corn flea beetle in INDIANA were more abundant than during 1960, and leaf damage to popcorn continued until midsummer in the central and east central areas of the State. In ILLINOIS, the pest damaged some corn fields in the southern half of the State in late May and early June, when up to 10 adults per plant were present. Approximately 12,000 acres were treated with insecticides. As many as 12 adults per plant were found in the west-southwest district of the State in late July, but the only possibility of damage at this time was from the spread of Stewart's disease. With the collection of this species in Winnabago County in 1961, there are now positive records from every county in Illinois. Moderate to heavy populations were observed on small corn throughout MISSOURI from late May to mid-June; however, little economic damage resulted from the feeding of the corn flea beetle adults. The species was not of economic importance in 1961 in KANSAS.

DESERT CORN FLEA BEETLE (Chaetocnema ectypa) damaged sweet and field corn and sorghum throughout the season in Washington County, UTAH, and less commonly elsewhere. Populations in NEVADA were moderate to heavy on corn and sorghum in July and August in Clark County. In ARIZONA, populations of 3 to 5 adults per stalk were common in the central and western areas of the State on young corn and sorghum during April, May and June. Considerable foliage damage was evident in some cases.

Infestations of a BILLBUG (Sphenophorus callosus) were light to heavy on corn in GEORGIA; about the same as in 1960, but lighter than in 1957, 1958 and 1959. A billbug, thought to be S. callosus, continued to be abundant in several fields of corn growing on muck soil in Montgomery County, INDIANA. The adults killed some seedling corn plants in the early summer, but in general the harvest was excellent. Larvae were not found in corn plantings. The heavy populations in Indiana were associated with the abundance of chufa flatsedge (Cyperus esculentus), the most common host plant of this species. In ILLINOIS, Sphenophorus sp. caused some damage to corn in the northern two-thirds of the State in late May and in June. As many as 3 adults per plant were found in the most heavily infested spots. RICE WEEVIL (Sitophilus oryzae) caused limited damage to grain sorghum in the southern half of TEXAS.

DUSKY SAP BEETLE (Carpophilus lugubris) infestations were heavy on sweet corn in Lincoln County, NEVADA, and it caused local injury to sweet corn ears as far north as Salt Lake, Davis and Utah Counties, UTAH, largely in home gardens. One field of market corn in Utah was severely damaged in Davis County. Its damage was commonest and most severe in southern Utah. Infestations were low at Columbus, Marietta and Wooster, OHIO, where control tests were established. Very few complaints were received in Ohio. The pest averaged 5 larvae and one adult per ear in untreated sweet corn in East St. Louis area of ILLINOIS during the period July 10 to 14. SAP BEETLES, especially dusky sap beetle, were again abundant in ears and tassels of sweet and field corn in all sections of MARYLAND. Carpophilus spp. were observed on corn and sorghum in MISSOURI, and Glischrochilus quadrisignatus was abundant in corn fields in the northern two-thirds of ILLINOIS in late July and August. In some fields in the latter State, 100 percent of the plants were infested. The highest population observed was 344 adults per 100 plants. Unspecified sap beetles caused local injury to corn at scattered localities in UTAH and were often reported as infesting corn, particularly sweet corn, in numerous localities of VIRGINIA.

A SCARAB (Euphoria inda) attacked sweet corn in Cascade County, MONTANA.

Unspecified species of WIREWORMS eliminated several stands of corn in VERMONT and destroyed some fields of corn in central and northwestern ILLINOIS in late May. They also caused some damage to corn in MINNESOTA, especially in the west central district where stand reduction was severe in a few fields. Wireworms were found on field corn during the season in COLORADO, and they damaged young grain sorghum in southern and coastal areas of TEXAS, necessitating replanting of some fields. Melanotus spp. damaged some corn and sorghum fields in MISSOURI during mid-May, mostly in the southwestern area.

CORN LEAF APHID (Rhopalosiphum maidis) was heavy on field corn in the Newport area of Newport County, RHODE ISLAND, in mid-August, and populations of the aphid ranged from light to moderate on the tassels and top halves of corn in all sections of MARYLAND during August and September. In OHIO, populations of corn leaf aphid were the lowest since 1956. Damage on a statewide basis was negligible, with only scattered areas reporting even moderate infestations; however, this species was by far the most injurious of corn insects in INDIANA. Loss in this State averaged 4 percent compared with 3.7 percent in 1960, a heavy year. The outstanding characteristic of 1961 in Indiana was the shift in population to the southern half of the State and very low populations in the northern half where the insect had been extremely abundant in 1959 and moderately numerous in 1960. In contrast, corn leaf aphid populations in ILLINOIS were considered to be widespread, but low in corn fields throughout the season. The aphid was also observed feeding on corn and grain sorghum in MISSOURI. The first corn leaf aphid was caught in yellow pan traps during the last week of

June in WISCONSIN. Colonies were noticeable on corn tassels in the southwestern counties of that State and in Waushara County during the last week of July. Generally, infestations were light and quite comparable with the 1960 infestations in Wisconsin. Populations on corn in MINNESOTA were widespread, but low throughout the season. Some high corn leaf aphid populations were observed in field corn during August in NORTH DAKOTA. Low populations of the species continued on corn and sorghum from July through September in NEBRASKA and it was present, but in noneconomic numbers, on corn and sorghum over much of KANSAS. Infestations in SOUTH DAKOTA were first noted on July 21 on field corn. Populations of corn leaf aphid were moderate to high on corn in the eastern one-half of the State throughout August and the first part of September. Damage resulting from the infestation is not known.

Light numbers of corn leaf aphid were occasionally found from January through April in small grain fields in OKLAHOMA. By May and early June light to medium infestations were becoming common in fields of young corn, and grain sorghum in the north central and northeastern areas during August and September. Heavy populations (200-400 per plant) still existed on late sorghum in late October in Garvin County. Up to 95 percent of the volunteer plants and 100 percent of Johnson grass terminals were infested in some localities of southwest Oklahoma in November. Corn leaf aphid was found on field corn in COLORADO during the season and it was found in many corn fields in southeastern WYOMING. Heavy infestations occurred in scattered areas of the latter State but, in general, the pest did not cause as much damage as in 1960. The largest populations occurred in August. Injury to corn was generally light in UTAH. Corn leaf aphid appeared on grain sorghum in damaging numbers in south central TEXAS and several heavy infestations were found on corn in southern NEW MEXICO. Also in New Mexico, occasionally light to heavy infestations were found in grain sorghum fields in Roosevelt County. Light spring infestations of the aphid were present in early sorghum in ARIZONA, but declined as the weather became hot. The fall infestations of corn leaf aphid began to increase about October 1 in Arizona sorghum and were heavy in many areas until harvest. The infestations on corn and sorghum in NEVADA were lighter than in 1960, the heaviest being in Clark County in September. Corn leaf aphid was medium on corn in the Quien Sabe Valley, San Benito County, and on milo in Davis, Yolo County, CALIFORNIA.

RUSTY PLUM APHID (*Hysteroneura setariae*) infestations in ARIZONA began to increase on sorghum earlier than in 1960 and were heavy in some fields in late September. The infestations were in combination with corn leaf aphid and remained heavy until harvest. In some fields, the aphids were in the heads in great numbers, and the honeydew deposits they left made harvesting difficult. This aphid has not been collected in Yuma County, Arizona.

CORN ROOT APHID (*Anuraphis maidiradicis*) injury was more evident in PENNSYLVANIA to corn than usual because of the poor conditions early in the season in the southeastern area. An unspecified black APHID was heavy on sweet corn in a few isolated cases in CONNECTICUT.

SOUTHERN GREEN STINK BUG (*Nezara viridula*) damage to grain sorghum was very light over TEXAS, as was SAY STINK BUG (*Chlorochroa sayi*), LEAF-FOOTED BUG (*Leptoglossus phyllopus*), and RICE STINK BUG (*Oebalus pugnax pugnax*). Say stink bug and *Euschistus impictiventris* caused damage to sorghum in some ARIZONA areas, but were of minor importance generally.

CHINCH BUG (*Blissus leucopterus*) severely damaged several fields of corn in central and southern portions of ALABAMA and damaging infestations occurred on grain sorghum in central and southern TEXAS. The annual hibernation survey in ARKANSAS showed a few more bugs than in past years. Although there was not a great difference in the classification between years, the actual number of bugs collected in comparable numbers of samples was about twice as many in 1961 as compared with 1960. On a square foot basis, the difference was even greater.

Migrations from small grains in MISSOURI began in early June in the southwest and continued until mid-July in the northern areas. Damage to small corn and grain sorghum in that State was confined mostly to the margins of the fields but, in the southwest, some fields were damaged enough to warrant controls. Populations of chinch bug remained at noneconomic levels in INDIANA. Populations in ILLINOIS were the lowest they have been in many years. The 1961 fall hibernation counts, based on county averages, rated one county light, one moderate and one severe, compared with 12 counties light, 11 moderate and 3 severe in 1960. The State average of bugs per square foot in bunch grass was 90.5 in 1961 compared with 289.7 in 1960. The greatest concentration of chinch bug adults was in the northern half of Champaign and southern Iroquois Counties. The annual adult hibernation survey in NEBRASKA, conducted in 29 counties, showed only one economic sample. This was one of the lightest populations on record for the State. Populations were also at the lowest level in several years in KANSAS. In OKLAHOMA, chinch bug populations remained at a low level, with very little damage noted. This is the fourth year that population levels have remained low or dropped. In the annual fall survey, only Okfuskee County (central area) had moderate numbers (500-1,000 per square foot) and light numbers (250-500 per square foot) were recorded in Lincoln, Rogers and Tulsa Counties. Thirteen Oklahoma counties showed a population decline from the 1960 survey. A PYRRHOCORID BUG (Largus cinctus californicus) occurred in heavy populations in corn plantings in the River District, Yolo County, and in dry fields in the Santa Maria area, Santa Barbara County, CALIFORNIA.

The first collection of SORGHUM MIDGE (Contarinia sorghicola) was made in ARIZONA, from sorghum in the Kansas Settlement area of Cochise County, on October 3, 1961. Additional surveys showed the infested area to involve 5 counties and to include everything east of a line running along the western border of Santa Cruz County, northward through Pima County just west of Tucson, and including Graham and Greenlee Counties. Infestations were generally light; however, in a few areas 30 to 50 percent damage was common. Most of the damage occurred to unseasonably late-planted sorghum, and that which was ready for harvest on October 1 was not damaged sufficiently to be noticeable. Extensive surveys in the lower elevation valleys failed to locate any infestations. Sorghum midge was reported as a pest in OKLAHOMA, occurred over most of TEXAS and caused extensive damage in spotted areas from the east to the plains and panhandle region. Few, if any, economic infestations developed on sorghum in ARKANSAS in 1961.

Moderate infestations and damage by SEED-CORN MAGGOT (Hylemya cilicrura) were reported from Monmouth, Kennebec County, MAINE, in late June. The pest was severe on field corn in VERMONT due to the late, wet spring. Infestations of seed-corn maggot were found on corn during the season in COLORADO and injury to corn was normal in UTAH or, in many counties, less than normal. The insect caused damage to corn in some areas of ARIZONA. but generally was of only minor importance. CORN BLOTCH LEAF MINER (Agromyza parvicornis) was heavy in localized areas of CONNECTICUT, being somewhat more widely reported than in 1960.

An estimated 2,573,812 acres of corn ground was treated at or before planting time to control SOIL INSECTS in ILLINOIS.

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) populations were abundant in part of a cornfield in Elmore County, IDAHO, during mid-August, resulting in extensive damage. Damage in UTAH to corn was very severe in parts of Davis, Weber, Salt Lake, Utah, Tooele and Juab Counties and locally in other areas of the State. Infestations on corn in WYOMING were not as severe as in 1960; however, severe damage was found in areas of Platte and Goshen Counties. The mites were first reported the last week of July and continued to be found until the middle of September. Two-spotted spider mite was found for the first time in corn fields of the Big Horn Basin. The mite was found on corn during the season in COLORADO, but was not of economic importance on sweet corn due to the prevailing weather conditions. Two-spotted spider mite caused sporadic damage to corn in the eastern area of WASHINGTON, and light to heavy populations were noted on corn in Ventura and San Joaquin Counties, CALIFORNIA. BANKS GRASS MITE (*Oligonychus pratensis*) damage to corn was very severe in parts of Davis, Weber, Salt Lake, Utah, Tooele and Juab Counties, UTAH, and locally damaging elsewhere.

A SLUG (*Derocerus* sp.) caused considerable damage to young corn plants early in the season in PENNSYLVANIA. In some fields, plants were completely killed, thus reducing the stand. Injured plants were slow in recovering.

GARDEN SYMPHYLAN (*Scutigerella immaculata*) continues one of the most serious pests in OREGON, with losses reported in all irrigated areas. Damage to corn seedlings was extensive in Yamhill County. The pest was also found on corn in COLORADO during the season. Medium populations of garden symphylan damaged a field corn planting in Clarksburg, Yolo County, CALIFORNIA.

Small Grain Insects

Highlights: GREENBUG was a problem in areas of several states during the spring. Controls were successfully used to combat the infestations. Typical "greenbug spots" were found in the south central area of Oklahoma by late March and the panhandle area reported increasing populations until mid-May. Earlier, damaging infestations were noted in northern Texas and southwest Oklahoma. Some damage was also reported during the season in south central, Kansas; Seward County, Nebraska; several Colorado counties; and in Bennett County, South Dakota. Damaging ARMYWORM infestations were reported in Missouri and Arkansas during 1961 and treatments were applied. ARMY CUTWORM was damaging to small grains in areas of several Western and Plains States during the spring, and PALE WESTERN CUTWORM caused severe damage to wheat in 2 Montana counties. HESSIAN FLY poses a threat in Kansas, and damage was reported in areas of Montana and Missouri in 1961. Damage by BROWN WHEAT MITE was reported from Texas and New Mexico northward to Idaho and Montana during the year. Losses to small grains were reported in several states. WINTER GRAIN MITE reached damaging proportions in northern Texas during the late winter and early spring.

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GREENBUG (*Toxoptera graminum*) infestations reached damaging proportions on small grains in the northern half of TEXAS during the late winter and early spring. In NEW MEXICO, populations were very light to nonexistent in wheat fields in the eastern counties during the spring, but an apparent buildup was noted in a number of Curry County wheat fields during October and November. Lighter infestations were reported in Colfax and Roosevelt Counties. Some losses to wheat in COLORADO which were attributed to greenbug and brown wheat mite (*Petrobia latens*) amounted to 5-30 percent in Baca, Bent and Prowers Counties. In other counties in southeastern Colorado, losses to wheat were 1-5 percent. In areas where losses occurred, greenbug populations in April were 1-3 per plant and, by the middle of May, populations had increased to 50-200 per plant. Greenbug was the major insect pest of barley in Colorado during the season. Counts in early April were 70-150 per 100 sweeps in the southeast and increased to 50-300 per 100 sweeps in all of the eastern area during May. Moravian barley in Weld and Morgan Counties was infested in April and May. Winter barley was not infested by insects such that losses resulted on the greater part of the acreage planted. There was some loss in the southeastern part of Colorado. Spring barley losses of 10 to 60 percent occurred in Otero, Prowers, Bent and Baca Counties, where the use of control measures reduced loss by 50 percent.

Greenbug infestations were light in ARKANSAS, with none reaching economic levels. In OKLAHOMA, infestations were common (averaged less than 10 per linear foot) in most fields of small grain throughout the State during the winter. Low populations continued until early March when moderate to moderately heavy (50-75 per linear foot) numbers were present in some central and north central areas. Heavy populations (500-600 per linear foot) were killing plants in the southwest by mid-March. By late March, 40-50 percent of the fields surveyed in the south central area exhibited the typical "greenbug spots", with chemical control measures becoming extensively used. By late April, populations were declining in most areas of Oklahoma except the panhandle area which reported increasing populations until mid-May. Fall checks revealed that light infestations were common in small grain throughout the eastern third of the State. Although no general outbreak existed in the Enid-Kingfisher area, localized fall "hot spots" were present that required control. Greenbug caused considerable damage only in two areas in south central and southwestern KANSAS. Populations over the remainder of the State were generally at noneconomic levels.

Light infestations of greenbug were noted in the southwest area of MISSOURI on wheat and barley in early April. These infestations increased rapidly for a week to 10 days until counts in a few fields ran as high as several hundred per foot of row. By late April, the population had again declined until counts ranged from zero to 15 per foot of row. Except for one week in mid-April, populations were low throughout Missouri and very few fields had insecticide applications. In NEBRASKA, approximately 100 per plant stem were found causing oats to yellow in Seward County during May. Elsewhere in the southern half of the State, populations of greenbug ranged from 5 to 50 per sweep on small grains in May and June. Greenbug was first reported in SOUTH DAKOTA about the end of May in the east central area. Counts were low and conditions were not favorable for high populations. An economic infestation did occur in Bennett County on small grains about the first of June. Considerable damage was done. Some farmers controlled the pest by treatments. The infestation was reduced and greenbug populations remained low during the rest of the season in South Dakota. In NORTH DAKOTA, early populations threatened seedling small grains throughout the southeast sections. Crops were extremely vulnerable to attack, but drought conditions and predators interceded and reduced numbers to noneconomic levels.

Greenbug was again present in MINNESOTA in 1961. It was first found on May 23 in the south central district and, by June 9, could be found in all districts. Populations were low over the entire State and very little crop damage was sustained. Predators, primarily lady beetle larvae, multiplied rapidly in June and helped hold populations in check. Greenbug disappeared rapidly by the first week of July and did not present a problem the remainder of the season in Minnesota. Greenbug appeared in oat fields during the first week of June in WISCONSIN, which is a week earlier than noted in 1960. This species was present in most oat fields in the southwest and west central areas of the State by the middle of June, but averaged less than one per sweep and was generally not a problem. "Red leaf" disease was negligible.

ENGLISH GRAIN APHID (Macrosiphum granarium) caused damage to wheat in some areas of ARIZONA, but was generally of only minor importance. The pest was rarely damaging in UTAH, and only trace numbers were found in wheat and barley in COLORADO. However, it was common on small grain in the north central and panhandle areas of TEXAS. Infestations of English grain aphid were common throughout OKLAHOMA in small grain. Populations increased during the late winter and spring, with the peak activity being reached in early April when up to several thousand per linear foot existed in small grain fields. By late April, however, populations were declining until most infestations were below the economic level. Very light (2 per linear foot) populations were beginning to appear in the early fall on newly seeded small grains. English grain aphid was noneconomic in KANSAS, and low to moderate numbers were present on small grains during April and May in NEBRASKA, where counts ranged from 2 to 500 per sweep in the southern and eastern areas. Counts of the aphid during late March, in the southern portion of MISSOURI, ranged from zero to 20 (average 7) per foot of row. These counts gradually increased through April until early May when counts ranged from 15 to 40 (averaged 12-20) per foot of row. From early May to mid-May, English grain aphid counts then decreased to very light numbers. No economic damage was observed in Missouri. Infestations of English grain aphid were generally light on small grains in ILLINOIS. The heaviest populations ranged zero to 160 (average 40) per sweep in the southwest district in late April. English grain aphid was found in Rock, Iowa and Lafayette Counties, WISCONSIN, on oats by April 26, which is a month earlier than in 1960. This aphid soon spread throughout the State, but never increased to economic numbers. "Red leaf" disease of oats and yellow dwarf of barley were negligible in 1961. In MINNESOTA, English grain aphid was found feeding in early June on emerging heads of winter wheat and rye in moderate numbers. Populations were generally low during the season. Predator populations increased during June and helped hold the numbers down. Infestations in NORTH DAKOTA were moderate on seedling wheat, barley and oats during the week of May 22 in the southeastern area. Populations thereafter declined and no economic injury was observed in any area. English grain aphid became common to abundant in many winter grain fields throughout much of northern IDAHO during June. In some winter wheat fields in Kootenai County, the pest averaged 9 per head, with many heads supporting populations of 25 to 30 aphids. Populations became drastically reduced in Idaho during July, however.

English grain aphid, APPLE GRAIN APHID (Rhopalosiphum fitchii) and Macrosiphum dirhodum were abundant from the fall of 1960 through the late spring of 1961 west of the Cascade Mountains in WASHINGTON. Yellow dwarf was prevalent and severe on both fall- and spring-sown wheat, oats and barley. Yellow dwarf was unimportant in the eastern area of Washington.

Apple grain aphid was light to moderate on small grains in the northern half of TEXAS and populations of the aphid were common in most small grain fields throughout OKLAHOMA. In the latter State, populations of 10-100 per linear foot of drill row existed until the peak activity was reached in early March (2,000 plus per linear foot). They were common, but started to decline by late April in most areas of Oklahoma but the panhandle. The first activity of this species in 1961 was in early November in Jefferson County. Light infestations were common in the northeast by late November. Apple grain aphid was noneconomic in KANSAS and very light populations were observed in MISSOURI.

CORN LEAF APHID (Rhopalosiphum maidis) infestations were light on barley in ARIZONA in mid-February, and did not build up as in some previous years, but heavy populations developed on barley cover crops in February in San Marcos, San Diego County, CALIFORNIA. The infestations in NEW MEXICO were much lighter in barley than during 1960 and the aphid caused only local damage to spring barley in scattered localities of UTAH. Light numbers were occasionally found from January through April in OKLAHOMA small grain fields and light to medium numbers were observed in the south central area in the fall. The spring infestation in Oklahoma was considerably lower than in 1960. The populations on barley in MINNESOTA were low and infestations did not become economic in NORTH DAKOTA. However, light to moderate populations were recorded on small grains in the north half of GEORGIA.

WESTERN WHEAT APHID (Brachycolus tritici) populations were generally light and spotted in NEW MEXICO and caused only minor injury to wheat fields in Curry and Roosevelt Counties. The aphid appeared in locally heavy populations in the TEXAS Panhandle, however. YELLOW SUGARCANE APHID (Sipha flava) damaged barley locally in north central TEXAS and was reported as a pest of cereals in OKLAHOMA. Unspecified APHID vectors on perennial grasses were present in low populations in March in OREGON and winter cereals were almost free of these pests in the Willamette Valley through mid-June. On June 11, checks in Benton County revealed only 4 percent of the plants infested. In ALASKA, barley yellow dwarf, spread by APHIDS, has appeared in the Matanuska Valley.

In CALIFORNIA, unspecified APHIDS were spotted heavy on oats in Riverside County, heavy on silage in Santa Maria, Santa Barbara County, and medium on barley in Chular area in November in Monterey County.

ARMYWORM infestations in ARKANSAS were heavier on small grains in the spring of 1961 than in 1960. Economic infestations developed and considerable grain acreage was treated. The first small larvae of the season in MISSOURI were observed in the southeast in late April. From early to mid-May, counts in wheat and barley ranged from 8 to 25 larvae per square foot in this area of the State and many of the fields were treated with insecticides. These Missouri infestations were confined mainly to the fields that had the most growth. During late May and early June, damaging infestations were observed in the rank and down spots of wheat, barley and fescue in the central and northeast areas. Egg deposition was spread over a long period of time, as indicated by the wide variation in the size of the larvae throughout the infestation. The first reports of armyworm in OKLAHOMA were from Major County in early June. Infestations appeared in all parts of ILLINOIS on small grains and grasses, but they were much heavier in the southwest district. As many as 30 per square foot were found in some lodged wheat and barley. Approximately 31,000 acres were treated in Illinois, of which about 16,000 acres were in the southwest district. Parasites were common in the central, west and west-southwest districts of the State by June 15. Some of the larvae were full grown at this time and numbered up to 30 per square foot in a few spots of lodged and small grains. Infestations of armyworm in INDIANA were below normal. A few small grain fields were treated in Knox and Daviess Counties. In NEBRASKA, the heaviest moth flight occurred during June and early July. Slight armyworm damage was noted in the eastern area of the State.

Armyworm infestations in VERMONT were exceptionally low and the pest was relatively scarce in NEW HAMPSHIRE. Of special interest in the latter State was the capture of freshly emerged moths at blacklight traps as late as November 16. Catches were also recorded at several locations during November in MAINE, the latest being November 20 at Farmingdale. Armyworm was reported in small grain and grasses from several areas of NEW JERSEY, but the infestations did not build up and damage was below normal. The pest caused moderate injury in MARYLAND to several grain fields on the lower Eastern Shore during May, but infestations were not in outbreak proportions. In VIRGINIA, light, local infestations occurred on rye, barley, wheat and lodged small grains. The only heavy infestations were reported in Northampton County where small grains were severely damaged.

FALL ARMYWORM (Laphygma frugiperda) infestations on small grains in TEXAS were lighter than in 1960 and the insect was reported as a pest in OKLAHOMA. WHEAT HEAD ARMYWORM (Faronta diffusa) was a minor pest of wheat in Curry and Quay Counties, NEW MEXICO, during June; but the species was not of economic importance in KANSAS during the year. YELLOW-STRIPED ARMYWORM (Prodenia ornithogalli) caused some damage to small grain and range plant acreage during the spring in local areas of southern and central UTAH, but the infestations were lighter than normal.

PALE WESTERN CUTWORM (Agrotis orthogonia) caused severe damage to wheat in Liberty and Toole Counties, MONTANA, and scattered infestations were found in small acreage in Yellowstone, Phillips, Valley and Dawson Counties in that State. In NEW MEXICO, heavy infestations were found on Conservation Reserve Lands in Harding and Curry Counties during May, where populations ranged from one to 15 per square foot. No serious losses of dryland grain occurred in UTAH.

ARMY CUTWORM (Chorizagrotis auxiliaris) occurred in spotted areas over MONTANA; wheat was attacked in Cascade and Liberty Counties. In IDAHO, infestations were reported spottedly throughout many winter wheat fields in the American Falls area during mid-May, often with 4 to 6 larvae per square foot and a 50 percent loss of stand. Hard, red spring wheat in the same area of Idaho was also injured.

Scattered, heavy populations of army cutworm damaged winter wheat and barley in several sections of NORTH DAKOTA during April and May and small populations of zero to 2 larvae per 6 linear feet of row were found working on winter wheat in southwest and south central SOUTH DAKOTA during the spring. Damage to small grains and range plant acreage in UTAH was less than normal during the spring. In NEBRASKA, heavy, damaging populations of army cutworm occurred on small grains as far as the eastern third of the State during April. In some areas, larvae were found to be moving in "armies" to new fields. The disturbance reached much farther east than was predicted. The first light trap collections in Nebraska were received April 13. The heaviest moth flights occurred the first two weeks in June, with the largest collection being 16,500 plus moths,on June 12, in the light trap at North Platte. The 1962 infestations in Nebraska could vary from the same to twice as heavy in a much more widely distributed area. Army cutworm damaged wheat in many fields in the western two-thirds of KANSAS during the spring. Cool temperatures and strong winds hindered controls. Some fields suffered severe damage by the cutworms moving and feeding in the typical "army" manner. Most fields were not so severely attacked as a result of favorable weather, plants recovered and produced the fifth largest wheat crop on record for the State. Trace numbers were present in COLORADO wheat.

Larvae of an ARCTIID damaged winter wheat in Rosebud County, MONTANA, during April; and SALT-MARSH CATERPILLAR (Estigmene acrea) was a problem on small grains in some areas of ARIZONA.

SAY STINK BUG (Chlorochroa sayi) was reported causing light damage to scattered wheat fields in Sheridan County, MONTANA. Also in Montana, a CHINCH BUG (Blissus occiduus) invaded wheat fields in Roosevelt County and was found in heavy concentrations in grasses in scattered areas across the northern tier of counties. A LEAFHOPPER (Draeculacephala portola) ranged from 6 to 10 per 10 sweeps on early rice and 20 to 40 per 10 sweeps on late rice in TEXAS. Surveys for RICE DELPHACID (Sogota orizicola) in rice-growing areas of TEXAS, LOUISIANA, ARKANSAS, MISSISSIPPI and FLORIDA were negative during 1961.

RICE STINK BUG (Oebalus pugnax pugnax) populations were generally low on rice in the coastal areas of TEXAS. Rice stink bug has become important on rice during the last few years. In ARKANSAS, infestations are correlated to a large degree with the presence of native grasses. A limited acreage of rice is treated each year in Arkansas. Unspecified STINK BUGS were heavy on barley in Imperial County, CALIFORNIA.

SIX-SPOTTED LEAFHOPPER (Macrosteles fascifrons) populations were very light on wheat in southern NEBRASKA during April and May; counts ranged 3 to 6 per 50 sweeps. Counts of one per 10 sweeps were present in small grain fields in southern NORTH DAKOTA by June 30, but populations declined and remained low the rest of the season. Noneconomic populations were reported on small grains in SOUTH DAKOTA.

Damage by HESSIAN FLY (Phytophaga destructor) was evident in southwest MISSOURI from mid to late May. In the heavier infested fields in this area, 25 to 35 percent of the plants had lodged; and, in fields scattered throughout the area, 5 to 15 percent of the plants were damaged. The average percent infestation in the annual survey was up in all Missouri areas checked except one, and the State average was up from 2.7 percent in 1960 to 4.1 percent in 1961. Infestations of this insect in ILLINOIS were light in most areas during 1961. The principal exception was Madison County which had an average of 86 puparia per 100 tillers and an average of 38 percent of the tillers infested. State averages, however, were only 9.6 puparia per 100 tillers and 4.9 percent of the tillers infested. An examination of puparia in the west-southwest district, April 25-26, showed 67 percent of the adults had emerged. Eggs were found as far north as Springfield at this time. In NEBRASKA, some lodging was found in southern area wheat in late June, with flax-seed stage present in Seward County in late June. The main adult emergence from samples collected in east and central Nebraska occurred September 18 to 25. Damage by Hessian fly in KANSAS was low; however, a late-fall hatch poses a potential threat to wheat in the north central area of the State for the spring of 1962. In MONTANA, infestations were high in Teton and Pondera County wheat fields, with infestations running as high as 10 percent. This area is about 200 miles west of previous light infestations found in the State. Infestations of Hessian fly in NEW JERSEY were light due to parasitism, and a light infestation of wheat was observed on experimental plots at Blacksburg, VIRGINIA.

WHEAT STEM MAGGOT (Meromyza americana) was present throughout MINNESOTA, but populations were very low and less than one percent of the plants were infested. WHEAT JOINTWORM (Harmolita tritici) was present in economic numbers in only a few fields in eastern KANSAS. WHEAT STRAW-WORM (H. grandis) caused local injury in scattered localities of UTAH. Trace numbers of a MUSCID FLY (Hylemya cerealis) were present in wheat in COLORADO.

WIREWORMS damaged spring wheat in Missoula County, MONTANA; caused light to moderate damage to small grains in scattered sections of NORTH DAKOTA; found light in legumes and small grains in southeastern NEBRASKA during the last half of April; and, along with FALSE WIREWORMS, killed out the stand of dryfarm wheat on over 300 acres in the Promontory area of Box Elder County, UTAH.

False wireworms were common and damaging in winter wheat in Glacier and Liberty Counties, MONTANA; and larvae were abundant in crested wheatgrass in the Raft River Valley area of south central IDAHO during July. In SOUTH DAKOTA, three counties reported infestations present in winter wheat during the spring. One field in Perkins County was seriously damaged and had to be reseeded. Light populations were reported in Stanley and Hyde Counties, with infestations averaging 2 larvae per foot.

WESTERN SPOTTED CUCUMBER BEETLE (Diabrotica undecimpunctata undecimpunctata) was active in February in OREGON, damaging winter cereals in Benton County.

RICE WATER WEEVIL (Lissorhoptrus oryzophilus) populations were slightly higher than 1960 in TEXAS, with general moderate to heavy leaf damage present. In ARKANSAS, this pest has become so common in rice that treatment by drainage became universal. Approximately 60 percent of the planting seed is now treated for control of this pest and a BEETLE (Maecolaspis sp.) in Arkansas.

Medium infestations of a RICE LEAF MINER (Hydrellia griseola) developed in all rice areas of Butte County, CALIFORNIA, and locally in Glenn County, while light populations occurred in Colusa County.

Populations of a BARLEY THRIPS (Limothrips denticornis) were higher in 1961 in MINNESOTA than in past years. Populations, although higher, produced little noticeable damage. Counts ranged from 2 to 20 per plant in the west central and northwest districts. Populations in other areas of Minnesota were very low or nonexistent. In NORTH DAKOTA, high populations of the thrips were observed in early planted barley through the eastern counties during the second week of June. Counts ranged from 2 to 10 adults per stem. Populations continued above normal in all but late-planted fields in North Dakota during June.

Infestations of EUROPEAN WHEAT STEM SAWFLY (Cephus pygmaeus) were low in NEW JERSEY due to parasitism.

Feeding activities of BROWN WHEAT MITE (Petrobia latens) caused severe dappling appearance in many fields of winter barley and winter wheat in southern Bonneville County, IDAHO, during late May and early June, with Alpine winter barley being the hardest hit. The mite was also reported as fairly general and moderately abundant on dryland winter wheat in the Malta area of Cassia County, Idaho, during the same period. Brown wheat mite occurred on over approximately 200,000 acres of winter wheat in the north central part of MONTANA. The pest destroyed marginal strips around many wheat fields during the fall of 1960 in Cascade and Chouteau Counties. In the spring and early summer of 1961, wheat fields in these Montana counties and surrounding counties were infested from light to heavy in most areas. Infestations were present in Fergus, Judith Basin, Cascade, Chouteau, Teton, Lewis and Clark, Hill, Pondera, Liberty, Blaine, Glacier and Toole Counties. Light numbers were present in NEVADA, and damage by the pest was found in Salt Lake, Box Elder, San Juan and Tooele Counties, UTAH, before the spring rains. In the latter State, economic damage generally was moderate in Juab, Box Elder, Tooele, Utah and San Juan Counties. Brown wheat mite was a problem in wheat fields in Roosevelt, Curry and Luna Counties, NEW MEXICO, during May and June; and the pest caused considerable localized damage to dryland wheat in the TEXAS Panhandle.

In COLORADO, some losses to wheat by this species and greenbug (Toxoptera graminum) amounted to 5-30 percent in Baca, Bent and Prowers Counties. In other counties in the southeastern area of the State, losses to wheat were 1-5 percent The brown wheat mite population in Baca County in March was 10-30 per linear foot, and there was an increase in numbers in April and May to 50-200 per linear foot. Brown wheat mite continued to cause some damage in small grain in areas of the OKLAHOMA Panhandle. Most of the damage in Oklahoma was done in early May but, by late May, populations had dropped below the economic level. Brown wheat mite caused farmers concern in southwestern KANSAS during 1961, and infestations were present on wheat in Morrill County, NEBRASKA, in early June.

WHEAT CURL MITE (Aceria tulipae) again was present in only light numbers in KANSAS and only a very limited amount of damage by wheat streak mosaic occured in the harvested crop. In WASHINGTON, a field of winter wheat was destroyed by wheat streak mosaic in the Horse Heaven area.

WINTER GRAIN MITE (Penthaleus major) infestations reached damaging proportions on small grains in the northern half of TEXAS during the late winter and early spring. In OKLAHOMA, light numbers (generally less, but up to 70 per linear foot) were present in the western wheat areas. By late April, only a limited number of the fields were infested. Large numbers were present in a few southeastern KANSAS wheat fields.

Range, Pasture and Lawn Insects

Highlights: An ERIOPHYID MITE (Aceria neocynodonis) was reported for the first time in Texas and Nevada, and damaging populations of the mite continue to be reported in areas of California, Arizona and New Mexico. BRONZED CUTWORM caused severe damage to bluegrass pastures in northwest Missouri, and GLASSY CUTWORM and SOD WEBWORMS caused pronounced damage to grass seed fields in Union County, Oregon. Sod webworms were also very damaging in areas of Rhode Island, New Jersey, Ohio, Indiana and Montana. RANGE CATERPILLAR was heavy in an area of Colfax County, New Mexico, and expected to be heavy in the same area in spring of 1962. CHINCH BUG damaged lawns in several states. A SPITTLEBUG (Prosapia bicincta) was of considerable concern in Bermuda grass in areas of Georgia and Alabama. CRANE FLIES were a serious problem on range in an area of California, and HARVESTER ANTS were a problem in areas of Utah and New Mexico.

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An ERIOPHYID MITE (Aceria neocynodonis) was present in damaging numbers in Bermuda grass pastures and lawns throughout the Bermuda grass-growing area of ARIZONA the entire season. It damaged Bermuda grass lawns in Las Cruces area of Dona Ana County, NEW MEXICO, and heavily infested and damaged Bermuda grass lawns in two areas of Clark County, NEVADA. General infestations of this eriophyid mite occurred on Bermuda grass in San Diego County, CALIFORNIA, and in spotted areas of Imperial County. Since Bermuda grass comprises a high percentage of home lawns in California, this mite is extremely important. The mite was also found in El Paso area of El Paso County, TEXAS, where it damaged Bermuda grass. Another ERIOPHYID MITE (Eriophyes sp.) was present in low numbers in the Texas Panhandle. A. neocynodonis was reported for the first time in Texas and Nevada during 1961.

Heavy infestations of FOREST TENT CATERPILLAR (Malacosoma disstria) were present on several areas of bitterbrush (Purshia tridentata)(an important browse plant on western ranges) in the area of Craters of the Moon National Monument in IDAHO during May. Also in Idaho, larvae of a PHYCITID (Eumysia idahoensis) caused considerable mortality to shadscale saltbush (Atriplex confertifolia), particularly in the Raft River Valley area in south central part of the State. The pest was also generally present in large numbers throughout the salt desert shrub area in southern Idaho. A PSYCHID (Apterona crenulella) caused less than average damage to large areas of rangeland plants in Cache, Box Elder, Duchesne and Weber Counties, UTAH.

From early to mid-May, high populations of BRONZED CUTWORM (Nephelodes emmedonia) were present in bluegrass pastures in northwest MISSOURI. Counts ranged from 3 to 25 larvae per square foot and severe damage was evident in pastures throughout the area. The infestations were confined to the northwest area of Missouri and no larvae were observed feeding on any crop other than bluegrass. Large infestations of ARMY CUTWORM (Chorizagrotis auxiliaris) were found during April and May in WYOMING. However, most infestations remained on rangeland and only in a few instances did they move into crop areas. The heaviest populations were found in Washakie, Hot Springs, Big Horn, Fremont, Goshen, Campbell and Laramie Counties. In MONTANA, army cutworm was present in scattered areas over the State. Test plots of grasses in Custer County were attacked. Army cutworm also attacked lawns adjacent to rangeland in southern Washoe County, NEVADA. GLASSY CUTWORM (Crymodes devastator) larvae caused pronounced damage to grass-seed fields in Union County, OREGON.

FALL ARMYWORM (Laphygma frugiperda) infestations were mostly light on Coastal Bermuda grass in GEORGIA and light on pastures in TEXAS, although some isolated damage did occur on turf in the latter State.

SOD WEBWORMS (Crambus spp.) were generally prevalent and destructive to turf throughout NEW JERSEY; relatively heavy in untreated lawns in areas of Washington and Kent Counties, RHODE ISLAND; numerous in many lawns during late summer in OHIO; and unusually abundant in lawns in north central INDIANA. Crambus spp. also caused pronounced damage to grass-seed fields in Union County, OREGON, and were abundant in several Merion bluegrass seed fields in Marion County of the same State. Larval counts in the latter location were 5 per 6-square-inch sod sample. An unspecified SOD WEBWORM attacked lawns in various areas east of the mountains in MONTANA.

RANGE CATERPILLAR (Hemileuca oliviae) denuded grassland areas near Abbott and Farley, Colfax County, NEW MEXICO. Eggs were very numerous on grass and weeds in this area when checked. Indications are that infestations will be very heavy during the spring of 1962.

A CRAMBID (Chilo loftini) seriously damaged pampasgrass in nurseries and home yards in central ARIZONA; and a PYRAUSTID (Nomophila noctuella) was unusually abundant in lawns in north central INDIANA.

A CHINCH BUG (Blissus leucopterus insularis) attacked lawns in southeastern TEXAS, and light to heavy infestations were present on St. Augustine grass in GEORGIA, but not as severe as in 1960. HAIRY CHINCH BUG (B. leucopterus hirtus) was abundant and destructive to bent grass lawns during July, August and September in NEW JERSEY. Hairy chinch bug did not appear in destructive numbers in OHIO until late in September. Fall surveys indicated that the insect is present in the area of Canton, Akron to Cleveland. An unspecified CHINCH BUG was abundant in late summer in the southwestern part of CONNECTICUT.

A heavy infestation of a MIRID (Labops utahensis) was found during late July in Custer County, IDAHO, where it damaged the plantings of a wheatgrass (Agropyron inerme). Another MIRID (Irbisia sp.) damaged intermediate wheatgrass in Pondera County, MONTANA. In UTAH, MIRIDS, largely Stenotus binotatus, Leptopterna ferrugatus and Thyrillus pacificus, damaged grasses and small grains spottedly in scattered, local areas. Adults of the LEAFHOPPERS (Endria inimica and Graminella nigrifrons) became very heavy on timothy grass in the Kingston area of Washington County, RHODE ISLAND, in late June.

MEADOW PLANT BUG (Leptopterna dolabratus) nymphs numbered 500 to 15,000 (average 750) per 100 sweeps in grass in the western district of ILLINOIS from May 8 to 11. Populations were rather high in most areas of the State.

A SPITTLEBUG (Prosapia bicincta) was serious and in outbreak proportions on several Coastal Bermuda grass pastures in central and southern parts of ALABAMA, where it completely destroyed the plants. This was the first report of trouble by this pest in Alabama. Infestations of P. bicincta on Bermuda grass in GEORGIA were light, with some local heavy populations present. Infestations of the spittlebug on lawn grasses were light to heavy in the latter State and, in general, reports of the pest were more numerous than in recent years.

RHODES-GRASS SCALE (Antonina graminis) damaged a great number of Bermuda grass lawns in Las Cruces, Dona Ana County, NEW MEXICO. An APHID (Microsiphum oregonensis) was present as a medium to heavy infestation on bud sage (Artemisia spinescens) in Elko County, NEVADA, in May and June.

GREEN JUNE BEETLE (Cotinis nitida) larvae were occasional pests in lawns in some VIRGINIA localities. NORTHERN MASKED CHAFER (Cyclocephala borealis) larvae caused heavy injury to several lawns in central Prince Georges County, MARYLAND, in September and October. Adults were extremely abundant about lights in the Prince Georges County area of Maryland during the first two weeks of July. Larvae of northern masked chafer also caused considerable damage to turf in the Akron-Canton-Massillon area of OHIO. JAPANESE BEETLE (Popillia japonica) populations were abundant and grubs damaged commercial and lawn turf in NEW JERSEY. Larvae were also occasional pests of lawns in some localities of VIRGINIA. A WHITE GRUB (Phyllophaga anxia) caused considerable damage to wet meadows in the northern sandhills area of NEBRASKA during July, August and September. A CERAMBYCID (Derobrachus brevicollis) was found on Bahia grass in Dougherty County, GEORGIA. It was first found on Bahia grass in Georgia in Seminole County in 1959. A CHRYSOMELID (Monoxia elegans) almost completely defoliated fourwing saltbush (Atriplex canescens) in several areas of Dona Ana County, NEW MEXICO, during August.

WHEAT STEM MAGGOT (Meromyza americana) severely inhibited seed production in some strains of arctic bluegrass in the Matanuska Station plots in ALASKA. This is the first indication that the pest may be a limiting factor in the eventual establishment of turf seed on a commercial scale in Alaska. In IDAHO, wheat stem maggot was reported during June as infesting crested wheatgrass plantings in the Bonners Ferry area.

CRANE FLIES (Tipula simplex and Tipula spp.) developed into serious range problems in Sonoma, Marin and Mendocino Counties, CALIFORNIA, early in 1961.

WESTERN HARVESTER ANT (*Pogonomyrmex occidentalis*) caused its usual extensive damage in UTAH by keeping thousands of acres of range and forage crop lands bare. *P. occidentalis comanche* and *P. maricopa barnesi* were troublesome in the Washington-St. George area of southwestern Utah. In NEW MEXICO, western harvester ant became active in rangeland areas in Santa Fe, San Miguel, Colfax and Harding Counties during the first two weeks of May. This ant is also a serious problem in rangeland areas in Lincoln and Socorro Counties, New Mexico.

THRIPS (*Chirothrips falsus* and *C. mexicanus*) caused damage to Bermuda grass in some areas of ARIZONA, but were generally of only minor importance.

CLOVER MITE (*Bryobia praetiosa*) caused damage to many lawns in WYOMING, and BROWN WHEAT MITE (*Petrobia latens*) populations developed to medium proportions on wheat grasses in the Herlong-Johnstonville areas of Lassen County, CALIFORNIA.

Flax and Safflower Insects

SIX-SPOTTED LEAFHOPPER (*Macrosteles fascifrons*) was first reported in MINNESOTA, on April 28, in a light trap collection at St. Paul and collected on bluegrass in Lyon County. Overwintering eggs began hatching during the week of May 22-26. Aster yellows was not a serious problem on flax in 1961. In NORTH DAKOTA, the first adults of the season were collected May 13 in the southeast counties. The survey indicated the season's initial migration was about one week earlier than usual. Counts were also higher, one adult per 10 sweeps, than recorded for a similar period in 1960. Infestation levels continued above 1960 counts through May and June across the southern half of the State, but were less numerous in northern areas. By June 30, counts averaged one adult per 10 sweeps in flax and legume fields through the southern sections. A population decline was noted following this peak, and remained at low levels the remainder of the season. Six-spotted leafhopper populations were noneconomic to light on alfalfa and flax in the eastern portions of SOUTH DAKOTA during May and June, and continued so during the rest of the summer.

BLACK FIELD CRICKETS were severe in sections of eastern and central NORTH DAKOTA and damaged flax; some swathed grain. Reports of twine cutting on hay bales were common. Some boll clipping was reported in west central and northwestern MINNESOTA, where populations were again heavy.

Infestations of CONCHUELA (*Chlorochroa ligata*) on flax in south central TEXAS required chemical controls in many instances.

On safflower, in CALIFORNIA, unspecified APHIDS required control in Tehama County, and BEAN APHID (*Aphis fabae*) populations were heavy in the Chico area of Butte County. LYGUS BUGS (*Lygus* spp.) were generally light on this crop.

Alfalfa, Clover and Vetch Insects

Highlights: PEA APHID was once again important as a pest of alfalfa in many areas of the country, although damaging infestations were not observed during 1961 in all of the reporting states. Spring and late summer and fall buildups were reported from several states, but this was not a general pattern. The infestation in northeastern Nebraska during May was said to be the heaviest ever witnessed by the entomologists in that State. Chemical controls were used in many instances, although parasites, predators and disease were effective in reducing populations in many states. SPOTTED ALFALFA APHID generally did not appear to be as damaging as in previous years; however, some local outbreaks did occur. The aphid apparently overwintered this past winter in

Oregon and Nebraska, but did not in Washington. Several PLANT BUGS were of importance on clovers and alfalfa in 1961 and required controls in many instances. POTATO LEAFHOPPER was abundant in areas of Maryland, Ohio, Indiana, Illinois and Wisconsin, where it caused yellowing of alfalfa. MEADOW SPITTLEBUG was the most serious insect pest on alfalfa and red clover in Indiana and high populations were recorded in areas of several Eastern States. Increased populations were noted in northern Idaho. THREE-CORNERED ALFALFA HOPPER caused severe girdling damage to alfalfa in Arizona. ALFALFA WEEVIL was abundant in alfalfa in a number of states, both in the East and the West. Untreated alfalfa was severely damaged in a number of instances. The pest was recorded in 13 Ohio counties and occurred in all but 7 northwestern Pennsylvania counties at the end of the year. All counties where alfalfa is grown in Georgia are now considered infested. Some spread was also recorded in Montana. The weevil was considered, once again, to be the most damaging crop pest in Wyoming. Damage by CLOVER LEAF WEEVIL, LESSER CLOVER LEAF WEEVIL, A WEEVIL (Hypera brunneipennis), CLOVER SEED WEEVIL, CLOVER ROOT CURCULIO, SWEETCLOVER WEEVIL and VETCH BRUCHID was also reported in several states during 1961. ALFALFA CATERPILLAR was not damaging generally, but some heavy infestations of alfalfa did occur in spotted areas of the country, particularly in the Northwest. GREEN CLOVERWORM was damaging only in a few areas. VARIEGATED CUTWORM was in outbreak proportions in Oklahoma for the first time since 1957. Considerable damage to alfalfa occurred in the central part of the State in May. Damage was also reported in southeast Missouri during the same period. ARMY CUTWORM damaged alfalfa in several Western States. MITES were reported damaging to alfalfa in Idaho, Oregon, Nevada, California and Arizona.

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PEA APHID (Macrosiphum pisi) was present in very large numbers in alfalfa during September in the Sun River Irrigation Project area of MONTANA. Populations in IDAHO remained relatively low throughout the State until early May, when numbers began to build up on alfalfa in the west central area, and continued abundant in many areas of northern Idaho on alfalfa from that date through mid-June. Populations in general were far below those encountered during the previous few years. Pea aphid populations in OREGON built up in alfalfa in the Merrill-Malin area of Klamath County in late March and were reduced by unfavorable weather during May. In Jackson County, counts of over 100 per 10 sweeps were not uncommon by May 18. In the Willamette Valley of Oregon, large numbers were present on trefoil, alfalfa and peas during May. These infestations continued into June, when high temperatures caused an adverse effect on pea aphid populations. By June 27, counts in Polk County averaged less than 2 per sweep. In late June and in July, serious infestations occurred in the Ontario area of Malheur County, with controls necessary. Late season counts were reduced throughout Oregon. Pea aphid was not as severe as in past years in CALIFORNIA. Light populations developed in February in alfalfa in the Arlington area and it became heavy in November in Riverside County. Heavy, local populations occurred in the Irvine area of Orange County, and medium populations were noted in the North Desert area of San Bernardino County. The pest was light on vetch and alfalfa in Butte County, medium in the Gustine area of Merced County and in the Woodland area of Yolo County, and local, heavy populations occurred in the Borrego Valley of San Diego County. The pest was medium generally in Siskiyou County and trace populations were present in the west side of Fresno County, California.

Pea aphid populations in NEVADA were generally below economic levels except in areas of Clark and Washoe Counties, where severe plant damage to alfalfa occurred in April. Populations approached economic levels in the central counties in June and controls were required in Humboldt County alfalfa seed fields in July and August. Infestations of pea aphid in UTAH substantially lowered forage alfalfa hay and seed production in a number of areas. Many outbreaks developed in the spring and early summer and some damage occurred in the fall. Populations in WYOMING were heavy on alfalfa throughout most of the State. The heaviest infestations occurred during the middle of June, just before the first cutting. After the first cutting in Wyoming, populations did not build up again until the latter part of August. The second buildup did not reach the high populations of the first. In COLORADO, some losses of alfalfa occurred because of this aphid. The populations in April were at levels of 2-100 per 100 sweeps and the number gradually increased to 200-50,000 per 100 sweeps in early July. Predators, parasites, controls and weather conditions reduced the populations in Colorado during August and September. Young stands of alfalfa were killed in several areas of NEW MEXICO during the early summer. Populations of pea aphid remained high in alfalfa through April in Roosevelt, Chaves, Eddy, Dona Ana and Sierra Counties and in Virden Valley, Hidalgo County, and Hondo Valley, Lincoln County. Light pea aphid infestations were present in alfalfa statewide in ARIZONA in late January and had increased to heavy by March 1. Infestations continued heavy until about May 10, when a rapid decline occurred. The buildup was several days earlier, and the decline a few days later, than in 1960 in Arizona.

Pea aphid occurred on legumes over most of TEXAS during 1961. In OKLAHOMA, the pest was common in most alfalfa fields of the State in January. Populations remained light until a gradual buildup occurred during February and early March. Moderate to heavy (up to several thousand) infestations on alfalfa and vetch were present from mid-March through late May, with a few damaging infestations persisting to early June. Noneconomic to light infestations were noted throughout the remainder of the year. Spring populations in some Oklahoma areas were heavier than in 1960. Pea aphid did not appear in damaging numbers in KANSAS. An extremely severe infestation occurred on alfalfa in the northeast area of NEBRASKA during May. Cool temperatures retarded plant growth, aided the population buildup and kept predator activity down. Approximately one-quarter of the first cutting was lost due to this insect. However, most stands maintained and continued plant growth. Some new seedling stands were killed. This was the heaviest infestation ever witnessed by entomologists in Nebraska. Populations of pea aphid were decreased by natural enemies in June and remained low the rest of the season. Elsewhere in Nebraska, populations were higher than in 1960, but caused no economic loss to crops. In the northeast area of the State during May, alfalfa plants and the ground were nearly covered by these insects. Elsewhere, populations ranged from 25 to 500 per sweep on legumes. In SOUTH DAKOTA, pea aphid was found in high numbers in the southeastern portion of the State on alfalfa during the third week of May. Counts of 600 per sweep were recorded in some alfalfa fields. Considerable damage was done to the forage crop, especially to seedling plantings. Populations remained high in the southeast, east central and southwest areas until the first week in June, when a reduction was noted. By mid-June, pea aphid populations were down to noneconomic numbers in South Dakota. They remained low for the rest of the summer. The northern portions of the State were not seriously affected by this pest in 1961.

Pea aphid populations in MISSOURI were high in vetch in the southeast area from early to mid-April, 50 to 300 per sweep. Some damage was observed in the heavily infested fields and a few fields received insecticide applications. From mid-April to early May, populations of pea aphid increased in clover and alfalfa in both the southwest and southeast areas until counts ranged from 30 to 500 per sweep. During mid-May, the populations declined and remained low throughout Missouri for the rest of the season. Infestations of pea aphid were very common, as usual, on alfalfa in ARKANSAS during the spring, with some stunting of plants occurring; however, little acreage was treated.

Pea aphid populations on alfalfa in MINNESOTA were extremely heavy in mid-May. Normally, the pest does not build up this early. Although high populations were present in May, little damage was evident. Fungus diseases were prevalent on alfalfa at this time and quite damaging, especially in the southwestern district. The disease damage was confused by many as pea aphid injury and some fields were treated with an insecticide. Predators of pea aphid did not multiply fast enough during the cool weather in May and June to reduce or hold populations in check.

In mid-June, predators and a fungus disease increased and pea aphid populations began to decrease. Although the aphid was not important on alfalfa the remainder of the season in Minnesota, populations did stay at a relatively high level. The aphid was relatively abundant throughout most of the season in WISCONSIN on forages. Counts during the first week of June averaged 300 per sweep in southwestern counties, but dropped off some afterward until the last week of July, when they began to build up slowly again. However, they never reached their previous peak.

Pea aphid was very abundant and did much damage to clover fields in the northern one-half of ILLINOIS. Some fields had both yield and quality of hay cut by as much as 50 percent. Damage was evident on small clover in the western district by May 10, at which time populations in this district varied from 6 to 480 (average 121) per sweep. Populations of pea aphid in late May and early June ran as high as 1,000 or more per sweep in the northern part of the State. Rain, parasites, predators, disease and chemical treatments practically eliminated the aphid population by June 20. However, they were building up again in northern Illinois by August 15. In late August, up to 300 per sweep were found in some clover fields in the northern area. Approximately 81,740 acres were treated to control pea aphid in Illinois in 1961. Damage in INDIANA was noted as far north as Tippecanoe County, and populations were damaging to alfalfa in OHIO in a few localized areas of the west central section. Pea aphid was very abundant on alfalfa early in the season in PENNSYLVANIA, but faded out quite rapidly. The first specimen was reported May 4 in NEW YORK; a more or less normal date. It was very abundant in the spring in that State, with a high count of about 5,800 per 100 sweeps being recorded the first week of June. Populations were low in the summer and quite high in late summer, with a count of about 1,290 per 100 sweeps in late August. Populations of pea aphid were exceptionally low in VERMONT throughout the season and unusually low in RHODE ISLAND, until a moderate buildup occurred after mid-July. Likewise, in NEW JERSEY populations were generally lower than normal, but a late buildup did occur in the central and northern areas of the State. In MARYLAND, pea aphid populations on first-growth alfalfa were considerably below those of 1960, ranging from light to moderate in most sections; however, several fields on the Eastern Shore were heavily infested. Pea aphid was present on alfalfa throughout DELAWARE by late March and early April. Where no controls were applied in that State, moderately heavy injury occurred during May, especially in Kent and Sussex Counties. Counts ranged 400-6,000 per 100 sweeps at this time. Populations continued to fluctuate in Delaware for the remainder of the season, with a general statewide increase occurring in mid-September. In VIRGINIA, pea aphid was prevalent during the spring and summer, causing damage infrequently to alfalfa. In most instances, their numbers were drastically reduced by diseases and predation.

The spring buildup of SPOTTED ALFALFA APHID (*Therioaphis maculata*) in ARIZONA was very light in all areas except Graham and Greenlee Counties. In those two counties, infestations became heavy in early March and remained heavy in some fields throughout March and the first week of April. This was earlier than normal for the spring infestation in this area. The summer buildup occurred in July, as usual, but was light and of a short duration in all areas of Arizona. Infestations were low statewide by August 1. Fall infestations began to build up in late September, but did not become heavy until about mid-October, when there was a sharp increase in some central and southwestern Arizona areas. Infestations were still heavy in a few fields, but were declining generally by November 1. Populations in NEVADA were generally low, except in Clark and southern Nye Counties in April, July and August, where severe infestations were present in some fields. Populations of spotted alfalfa aphid in CALIFORNIA varied considerably over the State from February to November. Biological agents, including a fungus, did a good job of controlling infestations most of the year. Some treatment was necessary to reduce populations in some areas of California, however. Resistance to insecticides has become evident in the Antelope Valley of Los Angeles County. Seasonal patterns from previous years varied considerably.

Spotted alfalfa aphid apparently overwintered successfully in Umatilla County, OREGON, as rare specimens could be found during most winter months. However, populations did not reach economic numbers in Oregon except near Umapine, Umatilla County, in late August. On June 18, wingless specimens were collected in Jackson County alfalfa and populations built up rapidly. Formation of honeydew in quantity was reported and controls were undertaken to save hay crops. Populations continued high through the last cutting period. In the Ontario growing area of Malheur County, aphids were dispersed from the State line to Huntington, Baker County, and Harper, Malheur County. Populations were subeconomic. In WASHINGTON, spotted alfalfa aphid failed to overwinter from the previous season. It was found near the Oregon state line in Walla Walla County in late August, when it became abundant then disappeared. Normal, scattered numbers were found in Asotin, Benton, Franklin and Walla Walla Counties in October. Spotted alfalfa aphid was found in most alfalfa-seed fields sampled in Canyon County, IDAHO, during early August, with populations consisting of 95 percent winged forms and 5 percent wingless forms. By mid to late August, all life stages could be found in sampled fields, with populations frequently running up to 40 aphids per sweep. By late August, populations were abundant and general in all fields checked as far east as Elmore County, Idaho. During September, populations continued to increase in the State and caused considerable damage throughout the southwestern area, particularly to newly seeded alfalfa.

Spotted alfalfa aphid infestations in NEW MEXICO were much lighter in alfalfa than they have been since this pest first became a problem in the State. Occasional moderate to heavy infestations caused some damage, but only a limited amount of alfalfa was treated. Infestations in TEXAS were generally light on alfalfa. Spotted alfalfa aphid caused the least damage to alfalfa crops that has occurred since southern UTAH became infested in 1954. Damage in 1961 in Utah was estimated at $60,000, as compared with $780,000 loss during 1955, $500,000 in 1956, $165,000 in 1957, $178,000 in 1958, $136,600 in 1959 and $75,000 in 1960. Spotted alfalfa aphid caused some losses to alfalfa in COLORADO. The aphid was found in Baca County on April 14, when population levels were 8 per 100 sweeps. The population slowly increased to a high of 400-5,000 per 100 sweeps in August and September. New seedlings of alfalfa were damaged in the Arkansas River Valley during August and September. The heavy, winter-early spring buildup of spotted alfalfa aphid was not as evident in OKLAHOMA as it was in 1960. Populations were generally less than 10 per square foot until late March, when an increase began. Populations increased in the southwest, south central and central areas of Oklahoma, where they were moderate to heavy, and in the southeast. Infestations remained heavy in some fields in the eastern third of the State, but declined elsewhere by late April. June surveys showed light (0-7 per sweep) populations of the aphid in the southwest, southeast and east central sections. Populations increased again in early July to heavy (50 per sweep) in localized areas. By late August, the pest had again declined and remained low throughout the late summer and early fall.

Spotted alfalfa aphid did not reach economic levels in ARKANSAS and did not appear in damaging numbers in KANSAS. In NEBRASKA, nymphal stages were readily found during mid-April in the area where sexual form populations existed in the fall of 1960, which indicated overwintering in the State. A gradual buildup occurred during May. Populations occurred in southern areas during mid-July and remained low until late October, with minor damage being reported. During late October and early November, counts of approximately 4,000 per sweep were recorded in the southwestern area. Oviparous forms were found in 17 counties in the fall of 1961 compared with 2 counties in the fall of 1960. The egg-laying form of spotted alfalfa aphid was found in SOUTH DAKOTA for the first time on November 20, 1961, in alfalfa fields near the Missouri River in Charles Mix and Gregory Counties.

Spotted alfalfa aphid was first found this past season in MISSOURI in the extreme southwest corner of the State on June 10. It was not found in the southeast area until the first week of August. By August 25, it had spread northward and could be found in many of the counties south of the Missouri River. The aphid was not found farther north in Missouri than the most southern counties in the west central district. The weather during the entire summer was very unfavorable for the spotted alfalfa aphid. This no doubt limited the spread of the aphid in the State and kept populations below economic levels. Spotted alfalfa aphid was taken July 24 in Harrison County, INDIANA, south of Mauckport on the Ohio River. Ten days later (August 3), it was found in Posey, Vanderburgh and Perry Counties, Indiana. These are the earliest dates that the pest has been collected in the State. Data on the development of this aphid the past few years suggest that initial infestations are coming into the State directly from the south rather than up the river valleys from the southwest. Consideration is being given to the possibility that more hardy, disjunct population is developing in the states directly to the south, which may eventually select a strain adapted to winter survival in the southern part of Indiana. Spotted alfalfa aphid infestations in GEORGIA were light and caused little trouble, except on fall-seeded alfalfa, where the pest was a problem to some growers.

YELLOW CLOVER APHID (Therioaphis trifolii) was first observed in 1961 in ILLINOIS the week of April 17-21, at which time it was present over a wide area of the State. By July 20, the populations of this aphid in clover fields in the southern part of Illinois varied from 720 to 8,000 per 100 sweeps. A few fields were very sticky with honeydew, and plants were definitely stunted. In NEBRASKA, yellow clover aphid populations averaged 15 per sweep on red clover in eastern and southeastern areas from April through July. SWEETCLOVER APHID (T. riehmi) was general in UTAH, but not numerous, and counts of the aphid in NEBRASKA ranged from 4 to 6 per sweep in the southeastern area from late April to early June. CLOVER APHID (Anuraphis bakeri) was common and frequently abundant in many clover fields throughout the northern part of IDAHO during late June and July.

Unspecified APHIDS in general occurred on many forage crops in CALIFORNIA. Light populations persisted for a much longer time than normal. Medium to heavy aphid populations developed on alfalfa plantings a good share of the year in Imperial County. Spotted, heavy populations were present on seed alfalfa in Lassen County and aphids were heavy on black-eyed peas in Riverside County.

PLANT BUGS, including RAPID PLANT BUG (Adelphocoris rapidus) and TARNISHED PLANT BUG (Lygus lineolaris), were abundant on red clover and alfalfa near maturity in all sections of MARYLAND in 1961. In ILLINOIS, tarnished plant bug, rapid plant bug and ALFALFA PLANT BUG (Adelphocoris lineolatus) were more abundant than in 1960. Nymphs were abundant throughout the State in clover and alfalfa in early June, when as many as 1,900 per 100 sweeps were observed. Populations of all three species varied from 0-790 (averaged 149) adults, and 0-660 (averaged 168) nymphs per 100 sweeps in clover and alfalfa in the west and west-southwest districts of Illinois about June 15. Approximately 85 percent of the population in the State was tarnished plant bug. By the middle of August, they varied from 200 to 1,000 adults per 100 sweeps in northern portion of Illinois. They undoubtedly caused much damage to clover seed fields. Tarnished plant bug, rapid plant bug and alfalfa plant bug were very common in alfalfa in WISCONSIN. Adults of these three species reached a combined total of 30 per sweep during mid-June. In MINNESOTA, Adelphocoris spp. and Lygus spp. populations were higher in alfalfa and red clover than for the last few years.

Tarnished plant bug populations were high on legumes in VERMONT, but populations did not appear to be as high as in previous years in NEW YORK. The pest was abundant in PENNSYLVANIA and evidence of its feeding was noticeable. Good growing conditions in the State reduced the damage to forage, however. The usual numbers of tarnished plant bug were observed on alfalfa and clover in VIRGINIA, but the damage was believed to be small. Populations were low on legumes in MISSOURI. Tarnished plant bug was present in limited numbers in the western two-thirds of OKLAHOMA by early March on alfalfa. Counts ranged from 1.2 to 15 per sweep in the southern part of the State by mid-May. The highest infestations (20-25 per sweep) of the year occurred in Choctaw County in late May on alfalfa and vetch. Light to medium infestations remained common in Oklahoma throughout June, with lighter populations in July and August. Heavier counts were again present (3-10 per sweep) in Choctaw County on alfalfa in late October and early November. The southeastern area of Oklahoma continues to be the predominant area of tarnished plant bug on alfalfa and vetch. In NEBRASKA, tarnished plant bug was light to moderate in all areas of the State, with the highest counts being 20 per sweep on red clover in the southeastern area.

Alfalfa plant bug is generally found in the northern two tiers of counties in WYOMING. However, a southern movement to the central counties was noted in 1961. Populations were very high in Sheridan and Johnson Counties. Surveys for alfalfa plant bug throughout NEBRASKA showed counts to range from 6 to 8 per 10 sweeps. The highest count was 12 per sweep on alfalfa in Lancaster County in early June. Alfalfa plant bug was found in all areas of SOUTH DAKOTA, but populations remained low throughout the summer. Little damage to alfalfa was attributed to the insect. Light populations remained active until the first heavy frost. In VERMONT, populations of this plant bug were high on legumes.

Rapid plant bug was low on legumes in MISSOURI, and very light, spotted populations occurred on legumes in NEBRASKA, with counts in the latter State averaging 6 to 8 per 10 sweeps. In VIRGINIA, the usual numbers of rapid plant bug were observed on alfalfa and clover, but the damage was believed to have been small.

LYGUS BUGS (*Lygus* spp.) were generally light on legumes over CALIFORNIA, but a few local medium to heavy infestations did develop. Most infestations were held in check by chemical treatments, however. *Lygus* spp. were plentiful in eastern OREGON alfalfa from early spring until October. Controls were necessary in Jackson County, with a decrease in populations noted in late August. In WASHINGTON, *L. elisus* and *L. hesperus* adults built up rapidly on seed alfalfa in the Yakima Valley by late May. Control programs were generally satisfactory. The first adult *Lygus* spp. activity of the year in IDAHO was noted in the Caldwell area of Canyon County in early March. During late March and early April, adults of these pests were found in greater than normal numbers throughout many areas of south central and southwestern Idaho. Populations during the summer remained about seasonally normal, but by mid-August, adult populations were running 20 to 40 per sweep in some alfalfa fields in Canyon County, and during the early fall often averaged 10 per sweep in many alfalfa fields throughout the southwestern area. In NEVADA, *Lygus* spp. began increasing in April in the southern counties and in May in the northern areas. Heavy populations of 30-45 plus, per sweep, were encountered from late May throughout the growing season in Nevada, with periodic treatments required in alfalfa-seed fields. *L. elisus*, *L. hesperus*, *L. desertus* and *Lygus* spp. were again abundant on seed alfalfa in UTAH, resulting in reduced seed yields. *Lygus* spp. caused some losses to alfalfa in COLORADO; populations were at levels of 300-500 per 100 sweeps in July and losses have been estimated at 2-4 percent in seed-producing fields in the western area. *Lygus* spp. infestations in ARIZONA were present in alfalfa throughout the year. The heaviest infestations occurred between June and October, when counts of 500-600 per 100 sweeps were common. In SOUTH DAKOTA, populations of *Lygus* spp. were light on alfalfa through the months of June and July, but no significant damage was reported. *Lygus* spp. were not of economic importance in KANSAS and they caused only light damage to alfalfa in TEXAS.

POTATO LEAFHOPPER (*Empoasca fabae*) adults appeared in NORTH DAKOTA on June 16 at Fargo, Cass County. The appearance was about one week later than recorded in 1960. Counts indicated a rather moderate initial migration into the eastern part of the State. Populations did not appear to increase substantially the remainder of the season. Specimens were first collected this season during the third week of June in east central SOUTH DAKOTA. Toward the end of June, they averaged 2.5 per sweep in alfalfa in the Brookings area. Populations did not become seriously high during 1961 in South Dakota. Infestations of potato leafhopper in NEBRASKA, during August, in the central, south and southwestern areas averaged 6 to 18 per sweep and caused "yellows" to alfalfa. The leafhopper was found in MINNESOTA at St. Paul on May 22. Light to moderate populations were present during the growing season. The first definite increase on alfalfa in WISCONSIN was noted the last week of June, when they averaged one per 2 sweeps in most regrowth alfalfa. The first specimen was caught in a blacklight trap at Madison on May 13. Counts continued to increase and averaged 20 nymphs and 4 adults per sweep in Sauk and Dane County alfalfa by August 4. Populations of potato leafhopper were more abundant during the past season in Wisconsin than they have been for several years, and yellowing of alfalfa was noticeable in many sections of the State.

The first potato leafhopper of the season in ILLINOIS was collected near Hamilton, Hancock County, western area, on May 11. By May 25, populations of 0-60 (average 11) per 100 sweeps were found throughout the State. The main migration into the State occurred June 2-4. A survey during June 5-8 showed populations of adults to be 60-200 per 100 sweeps south of a line from Quincy to Lawrenceville, and 4-250 north of a line from Rock Island to Danville. Between these two lines, the population was 60-1,400 adults per 100 sweeps. Nymphs were emerging throughout Illinois by June 23 and, by July 14, adults ranged from 50 to 1,100 per 100 sweeps and nymphs from 10-31,700 per 100 sweeps in clover and alfalfa in the west, west-southwest and central districts. At this time, 40-50 percent of the alfalfa in these 3 districts showed some degree of yellowing, with 20 percent of the fields severely yellowed. An estimated 15,473 acres of alfalfa were treated, mainly in the northeast, northwest and central districts. Many more acres could have been profitably treated. In MISSOURI, potato leafhopper counts in the southwest, central and east central areas ranged from 3 to 35 per sweep in alfalfa during early to mid-July. After the alfalfa was cut, the populations declined and remained low for the rest of the season. Potato leafhopper was generally abundant in INDIANA, causing serious damage to alfalfa but, on other crops, infestations were generally low and few complaints were received. The pest caused severe damage to second and third cutting alfalfa in north central OHIO, but only moderate damage occurred in southern portions of the State. Potato leafhopper was more than usually injurious to alfalfa in MARYLAND, and populations of from 20 to 100 per sweep were common in the central and eastern counties during August. Populations in NEW JERSEY were lower than normal, but several reports of injury to alfalfa in the central area of the State were received during late August at the time potatoes were harvested. The first specimen of the year in NEW YORK was recorded on June 21; a more or less normal date. Populations of potato leafhopper did not appear to be as high as in previous years in New York.

CLOVER LEAFHOPPER (Aceratagallia sanguinolenta) populations remained light to moderate on alfalfa throughout the summer in SOUTH DAKOTA, except in a small area of northwestern McPherson County. There, populations of up to 30 per sweep were observed in early August. No other reports of serious outbreaks were obtained in the State. Infestations of SIX-SPOTTED LEAFHOPPER (Macrosteles fascifrons) were generally light on legumes in NORTH and SOUTH DAKOTA. Populations in MICHIGAN were erratically distributed. A heavy population was surveyed at Stockbridge, June 1-3, and lesser numbers at Easton Rapids and Bay City before June 15. However, after this flurry, populations subsided. Average numbers of a LEAFHOPPER (Colladonus geminatus) were present on alfalfa in UTAH. Medium populations of a LEAFHOPPER (Empoasca sp.) occurred on alfalfa in November in Monterey County, CALIFORNIA. LEAFHOPPERS, primarily Empoasca sp., caused some damage to alfalfa in ARIZONA, but were generally of only minor importance.

MEADOW SPITTLEBUG (Philaenus spumarius) became unusually abundant on alfalfa in southern RHODE ISLAND; nymphs were evident as late as the end of June. Nymphal populations were as high as 0.9 per stem on birdsfoot trefoil in VERMONT. The first nymph of the season in NEW YORK was recorded on May 13; a more or less normal date. Adults and nymphs were high during the year, especially in first-hay crop fields that were cut in late June or early July. Populations in PENNSYLVANIA were not in damaging numbers in areas treated in past years, but in some other areas, where alfalfa weevil (Hypera postica) treatments were not used, populations of meadow spittlebug were large enough to be of some consequence. Meadow spittlebug numbers were normal in NEW JERSEY, but several reports of injury to alfalfa in late August were received. In MARYLAND, moderate to heavy populations were noted on first-growth red clover in Cecil, Queen Annes and Washington Counties.

Meadow spittlebug populations in OHIO were at the lowest level in recent years. Although there were damaging populations in the east central area, populations over much of the State were subeconomic. Fall surveys in Ohio indicate higher populations will develop in the spring of 1962, especially in the central and eastern counties. The spittlebug was again the most serious insect pest of alfalfa and red clover in INDIANA. In addition to the expected heavy infestations in the eastern area, the buildup in the central part of the State was greater than anticipated. In ILLINOIS, the first nymphs of the season were observed in Warren County on April 19. By May 15, the population in the northwest district varied from zero to 220 and averaged 65 nymphs per 100 stems. Adults were beginning to emerge the week of June 2-9. Approximately 24,000 acres were treated for control of meadow spittlebug nymphs in 1961. The fall adult survey showed the population in the State is still declining as it has been for the past few years. Only low numbers were found in MINNESOTA in 1961, those being in the southeast. Meadow spittlebug continued to increase in abundance in clovers, alfalfa and on various native vegetation throughout many areas of northern IDAHO. The first-generation cycle was virtually complete in that State by the end of June.

GARDEN FLEAHOPPER (Halticus bracteatus) adults were common in alfalfa and clover in most sections of MARYLAND during August and, in one large field of alfalfa in Frederick County, were responsible for considerable injury. An unusual infestation, with populations as high as 36 per sweep, was found on alfalfa in Harrison County, INDIANA, near Mauckport.

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) infestations were light in ARIZONA alfalfa during April and May and began to increase in June. Heavy infestations occurred from July through October. Counts of 1,000 adults per 100 sweeps were common during this period and severe girdling damage was evident in many cases. Populations in NEVADA were heavy on alfalfa in Clark County. Light to moderate populations occurred over TEXAS and the pest was present on alfalfa throughout the year in OKLAHOMA. Activity was first reported in Oklahoma on alfalfa in the southwest in late May. The highest infestations were noted in the southwest (up to 15 per sweep) in September. Light populations were noted as late as mid-November in alfalfa in the south central area. The September populations in Oklahoma were considerably higher than those of 1960 in the southwest.

SAY STINK BUG (Chlorochroa sayi) damaged very little alfalfa seed in UTAH; populations were well below normal on alfalfa. Say stink bug and Euschistus impictiventris were only minor pests generally, but they did cause damage to alfalfa in some ARIZONA areas. In CALIFORNIA, unspecified STINK BUGS were medium in alfalfa in Imperial County. CONCHUELA (Chlorochroa ligata) numbers were heavy in alfalfa in the Borrego Valley area of San Diego County and Euschistus conspersus developed to medium infestations in several instances on seed alfalfa in Fresno and Butte Counties, California.

A GROUND MEALYBUG (Rhizoecus kondonis) was present in medium numbers in alfalfa fields in Clarksburg, Yolo County, CALIFORNIA.

ALFALFA WEEVIL (Hypera postica) abundance is increasing in general in CONNECTICUT. Very light infestations of early stage larvae were first observed in RHODE ISLAND during May in South Kingstown, Washington County. No severe populations developed except by late June populations existed that could produce economic numbers during 1962. Populations in NEW YORK were average in abundance, but the buildup was later in 1961 than in other years. Alfalfa weevil was found in 8 new PENNSYLVANIA counties in 1961. Only 7 counties in the northwestern area have not been reported as infested. Activity of the weevil was varied throughout the State and,in fields where no fall controls were applied,spring infestations in most instances were very heavy and considerable loss resulted. The development of the larvae was late, so that at the time of the first cutting a majority of the larvae were still in early stages and, as a result, the second cuttings of alfalfa were delayed by the feeding of the pest on the new growth. Infestations were general throughout NEW JERSEY and required insecticidal treatments to protect the first cutting of alfalfa. Statewide survey shows that parasite control is less than one percent. In DELAWARE, statewide hatching of overwintering alfalfa weevil eggs commenced by the first week in March and first and second instars were noted feeding in all areas by the second week in March. Marked increase in larvae occurred in Sussex County about mid-April, followed by an increase in adult activity during late April. Feeding injury to first-growth alfalfa increased rapidly in Delaware and, by mid-May, injury was moderate to heavy in most areas, but not as severe as in 1960. However, some additional losses did occur this past season in fields that had control applications where, in previous years, these same fields, using different insecticides, control was excellent with little injury. Injury to subsequent growth of alfalfa was negligible for the remainder of 1961 in Delaware.

The first alfalfa weevil adults and eggs observed on MARYLAND alfalfa were in Queen Annes County on March 22. Larval damage to first-growth alfalfa ranged from light to moderate and, as usual, untreated fields in all sections of the State were severely injured, with the heaviest losses occurring in the central and western sections. Heavy, statewide infestations of larvae were observed on untreated alfalfa in VIRGINIA. Larvae heavily infested Ladino clover at one locality in King and Queen County. Adults failed to migrate from alfalfa fields in many Virginia localities and inflicted heavy damage in late June and early July. This was an unusual occurrence and its causes are being investigated. Adults were observed migrating to alfalfa in September and later, and the peak of egg laying occurred in early December. Alfalfa weevil was found in an additional 12 OHIO counties during 1961, making a total of 13 with known infestations. Severe damage was observed in very few fields. In several counties, every field entered was observed to be infested. No control was attempted.

Alfalfa weevil infestations in GEORGIA were more severe than in previous years. All counties where alfalfa is grown are now infested. Fields treated in the fall of 1960, with a certain chlorinated hydrocarbon, had excellent control; fields not treated in the fall had all terminals infested on March 11. Growers using a specific phosphate insecticide in the spring had poor to good control. In late February, adults, larvae and eggs were present in alfalfa in the central area. One to two larvae were present in every terminal on March 11 in Oconee County when the alfalfa plants were 3 inches tall. Larvae were infesting alfalfa at 55 per sweep on April 15 in the Oconee County area. Fields treated with a specific hydrocarbon in the fall of 1960 had one larva per 10 sweeps on this same date. Larvae were collected on alfalfa in Paulding County the week of July 4.

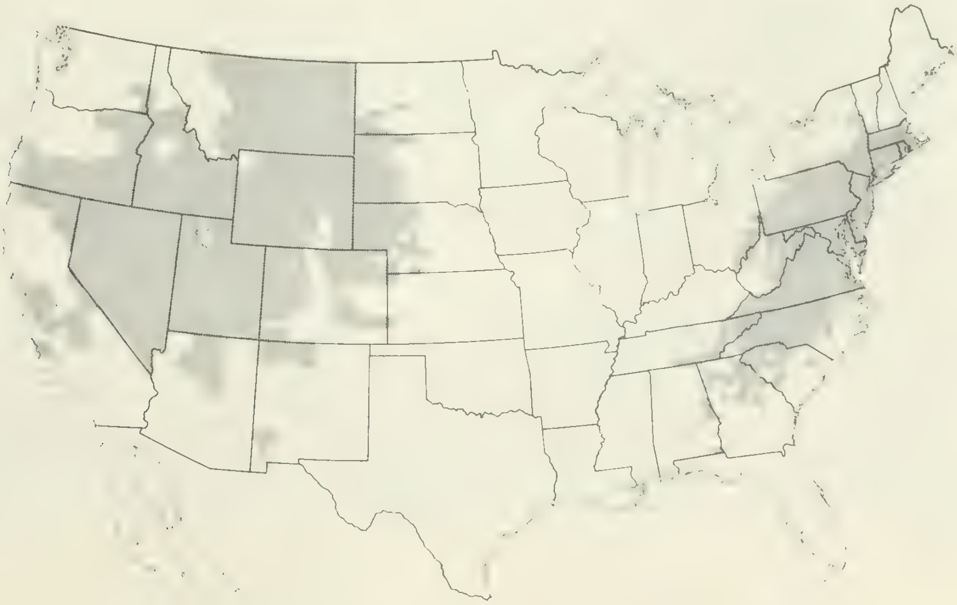
Alfalfa weevil larvae were common in alfalfa previously recorded as infested near Clarkston, WASHINGTON. Adults were collected for the first time (in white clover seed fields) 12 miles southeast of Anatone, Asotin County. In OREGON, adults averaged 2 per 10 sweeps in Malheur County on April 26. Small numbers of larvae began appearing in mid-May and, by June 7, up to 150 larvae per 10 sweeps were counted. Considerable damage occurred in fields not cut early. Larvae were abundant, up to 57 per sweep, in Wallowa County on July 1, with an estimated 35 percent damage to the first cutting. In alfalfa previously found infested in Union and Baker Counties, infestations appeared reduced.

Newly emerged adults were observed in Baker County on June 2. An ichneumonid (Bathyplectes curculionis) was common in some Oregon fields. Medium to heavy alfalfa weevil populations developed in alfalfa in Siskiyou, Modoc and Lassen Counties, CALIFORNIA. Some local difficulty in control was experienced. The alfalfa weevil and Hypera brunneipennis have now extended their ranges to the extent that both are found in San Luis Obispo County.

Alfalfa weevil has now spread into the Gallatin Valley of MONTANA and into Broadwater County in the same State. Considerable damage occurred at both these localities. In IDAHO, overwintering adults became active in the Boise Valley and Clearwater Valley areas during early March. Egg laying in the Boise Valley area was noted at the end of March and, by April 7, numerous first instars were noted in several fields throughout Canyon County. By late May, counts of the weevil were averaging approximately 3 adults and 100 larvae per sweep in many alfalfa-seed fields checked in Canyon County. During mid-June, several alfalfa fields in Elmore and Gooding Counties were damaged by larval feeding and, in late July, some second-crop alfalfa in the northwestern area of Idaho was severely damaged by larval feeding. The weevil was once again the most damaging crop pest in WYOMING. Heavy infestations occurred in the western and north central parts of the State.

Alfalfa weevil adult activity and egg laying began in NEVADA during late February. Larval development was delayed due to the cool spring weather, and peak larval populations did not occur until the end of June in most areas. Damage to untreated fields was severe in Nevada. Damaged acreage in UTAH was much less in 1961 due to the more general controls that were applied. The total loss to alfalfa in COLORADO was approximately 1-2 percent, most of which was caused by this species. Alfalfa weevil adults were active early in March in Colorado, and larvae were found on May 5 at counts of 4-6 per 100 sweeps. In June, the counts were 50-700 per 100 sweeps and, in August, counts were 100-300 per 100 sweeps. Early in September, adults were being found. Alfalfa weevil larvae were 20 to 70 percent parasitized by B. curculionis in Colorado. Adult counts in the panhandle area of NEBRASKA during June were 1-2 per 100 sweeps and larval counts reached 110 per 100 sweeps. Alfalfa weevil was not observed during 1961 in KANSAS. Larvae, and typical damage caused by this pest, were noted in many alfalfa fields in San Juan County, NEW MEXICO, during June.

Distribution of Alfalfa Weevil



CLOVER LEAF WEEVIL (Hypera punctata) adults were numerous on white clover seed fields in the Columbia River Basin of WASHINGTON during May. In OREGON, adults were common in alfalfa in Morrow and Umatilla Counties in April. Severe damage occurred in some Jefferson County fields. Larvae were mature the week of May 21 in Oregon, and newly emerged adults were observed in Baker County alfalfa on July 2. Clover leaf weevil was present throughout most of IDAHO, with populations generally low and spring larval counts running 3 or less larvae per alfalfa crown. In NEBRASKA, there was considerable larval activity present on alfalfa in the northeast, east, central and southwestern areas of the State during early May. Clover leaf weevil was not economically important in KANSAS in 1961. Populations of larvae in MISSOURI ranged from 3 to 10 per square foot in clovers from late April until early May. The larvae then became diseased and the populations declined and remained below the damaging level. The weevil was more abundant than for the last 2-3 years in ILLINOIS, and equal to, or slightly above, the seven-year average. Damage occurred to red clover fields in most districts of the State. An estimated 32,715 acres were treated in Illinois. Clover leaf weevil was present on alfalfa in ARKANSAS for a short period during the spring in the north central area, but infestations were not economic. The pest was fairly abundant and its feeding was quite noticeable in PENNSYLVANIA.

LESSER CLOVER LEAF WEEVIL (Hypera nigrirostris) larvae again caused economic injury to first-growth red clover in most sections of MARYLAND by feeding within the axils and buds, and the insect was abundant and caused severe injury to a field of trefoil in VERMONT. Larvae were infesting 70-100 (average 83) percent of the red clover stems in the southern half of ILLINOIS by May 26. Newly emerged adults averaged 12 per sweep on red clover in Lancaster County, NEBRASKA, during mid-June; and there was considerable adult and larval feeding by this pest on white clover seed fields in Asotin County, WASHINGTON, during May. CLOVER HEAD WEEVIL (H. meles) caused some reduced yields in crimson clover seed production in the northeastern area of ARKANSAS. Research has been conducted on control measures in that State.

A WEEVIL (Hypera brunneipennis) caused heavy damage to 2 cuttings of alfalfa on the Yuma Mesa in Yuma County, ARIZONA. Infestations began to increase about February 1 and were heavy by mid-February. The decline began about April 15 and, by April 20, infestations had almost completely disappeared. Lighter infestations occurred in the Gila River Valley of Yuma County and in the central area. This weevil was more in evidence in 1961 than the past few years in Imperial, Riverside, San Bernardino and Orange Counties, CALIFORNIA.

CLOVER SEED WEEVIL (Miccotrogus picirostris) controls were required on white clover plantings in Wallowa County, OREGON; newly hatched larvae were observed June 30. Heavy infestations of 5-15 clover seed weevil adults per sweep developed during the first week of June on white clover raised for seed in Asotin, Garfield and Whitman Counties, WASHINGTON. There was considerable seed loss where the controls were inadequate in Washington. The seed weevil continued to be moderately abundant during 1961 in IDAHO, with adult populations in nontreated Ladino and white clover fields in the Clearwater River drainage area ranging from 15 to 20 per sweep during June, and averaging generally considerably lower in white clover seed fields in the more northern areas of Idaho.

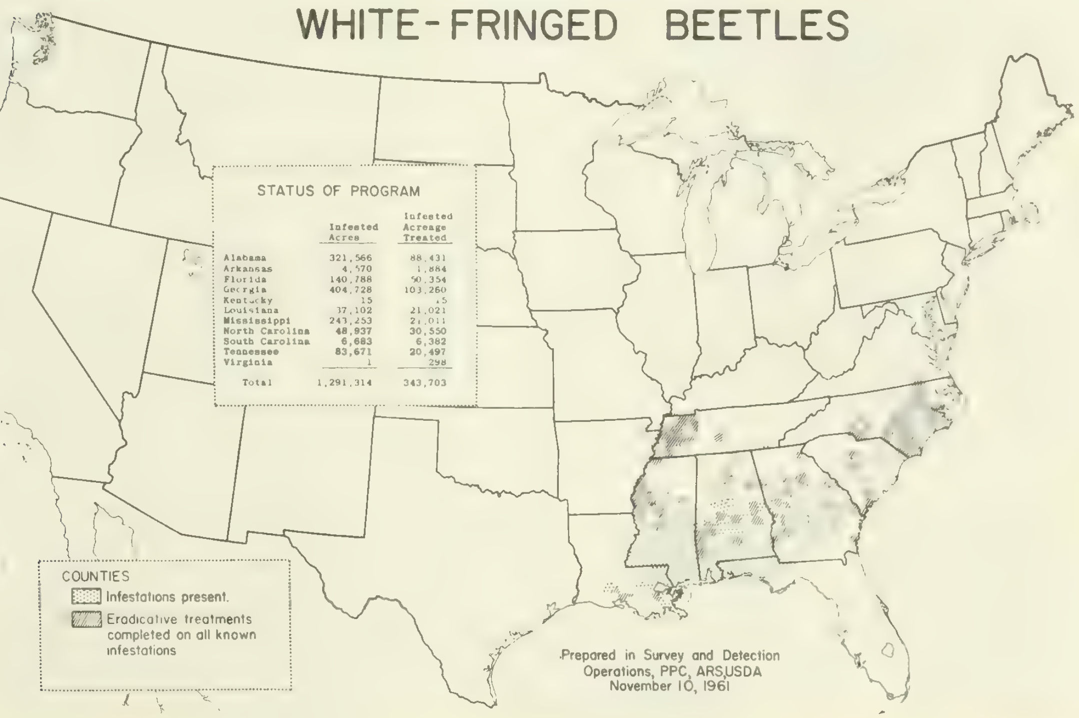
CLOVER ROOT CURCULIO (Sitona hispidula) was more abundant in Ladino clover seed fields in Jackson County, OREGON, than for several years. Adult populations in IDAHO continued relatively abundant throughout the State, with injury from larval feeding generally not ascertained. Adult feeding signs were commonly found on alfalfa and sweetclover in April and May in the eastern one-third of NEBRASKA. Counts in this State ranged 1-12 per 10 sweeps in early November. Clover root curculio was relatively light in KANSAS and MISSOURI. The extent of damage to alfalfa and clover was believed light in VIRGINIA, although the usual numbers were observed.

SWEETCLOVER WEEVIL (Sitona cylindricollis) caused severe defoliation of seedling sweetclover stands in southeastern NORTH DAKOTA. These weevils were active and damaging young sweetclover stands by the middle of April in southeastern SOUTH DAKOTA, but the overall damage in 1961 was light and no serious damage was noted. A low population was present through June in NEBRASKA, with little damage occurring to newly seeded stands. Populations averaged 2 per sweep in late June. Sweetclover weevil was common in UTAH, but injury to sweetclover was rarely serious. The populations were near normal in ILLINOIS; approximately 7,700 acres were treated, of which about 6,000 were in the west and central districts.

A WEEVIL (Sitona scissifrons) was active in alfalfa in southeastern SOUTH DAKOTA by the third week in April. Populations averaged 3 per sweep during May in the southeast and east central areas. Numbers reduced to an average of 5 per 10 sweeps from mid-June to September. Small populations of the weevil were found as far west as Mellette County, South Dakota.

CLOVER ROOT BORER (Hylastinus obscurus) infested 60 to 100 percent of the red clover-seed fields in Lewis County, WASHINGTON, in August, when the larvae were becoming full grown and pupating. Larval damage, plus the unusually hot weather, caused 30 to 40 percent of the seeds to be highly shriveled and light. A CLOVER WEEVIL (Tychius stephensi) did not appear to be as numerous as in previous years in NEW YORK.

VETCH BRUCHID (Bruchus brachialis) appeared to be more numerous than usual in OREGON during 1961. Reinfestations from hay seed fields was a particular problem in the northern Willamette Valley. Control was poor in some fields. Infestations of the pest in TEXAS caused generally moderate to heavy damage to vetch seed in vetch-growing areas of the State.



WHITE-FRINGED BEETLES

STATUS OF PROGRAM

	Infested Acres	Infested Acreage Treated
Alabama	321,566	88,431
Arkansas	4,570	1,884
Florida	140,788	50,354
Georgia	404,728	103,260
Kentucky	15	15
Louisiana	37,102	21,021
Mississippi	243,253	21,011
North Carolina	48,937	30,550
South Carolina	6,683	6,382
Tennessee	83,671	20,497
Virginia	1	298
Total	1,291,314	343,703

COUNTIES
▒ Infestations present.
▨ Eradicative treatments completed on all known infestations

Prepared in Survey and Detection Operations, PPC, ARS,USDA November 10, 1961

WHITE-FRINGED BEETLES (Graphognathus spp.) are now known to infest a total of more than 1,291,000 acres in 11 states. The map on the preceding page shows the status of the program as of November 10, 1961. The infestation that was present in NEW JERSEY was declared eradicated in 1960 following negative surveys for three successive years. The infestations that were found in KENTUCKY and VIRGINIA during 1960 have been treated in their entirety, including a substantial buffer zone. Spread of the pest was reported to include a total of 16 new counties in 5 states. They are as follows: ALABAMA - Bibb, Blount, Chambers, Shelby, Sumter, St. Clair, Walker; GEORGIA - Columbia, Walton; MISSISSIPPI - Amite, Choctaw, Lee, Winston; SOUTH CAROLINA - Lee; TENNESSEE - Bradley, Franklin.

BLACK BLISTER BEETLE (Epicauta pennsylvanica) was reported feeding on alfalfa flowers in PENNSYLVANIA in August, and the pest was reported to be causing plant damage in MICHIGAN for the first time in several years. Lupines were defoliated at Gaylord, Kalkaska and Roscommon, which is the north central part of the Lower Peninsula of Michigan. In SOUTH DAKOTA, black blister beetle was noted in Conservation Reserve Land and alfalfa fields about the first of August in the north central area. Populations were spotty. Some fields had 10 adults per sweep while others had none per 10 sweeps. Populations remained moderate in the central, north central and northeastern areas throughout August in the State. ASH-GRAY BLISTER BEETLE (E. fabricii) was first noted during the third week of June. During June and July, the latter species averaged from 2 to 23 per 10 sweeps in the eastern area; only light feeding was observed. Low numbers of Epicauta spp. were found feeding on legumes in MISSOURI. Several species of BLISTER BEETLES were present in large numbers on alfalfa throughout KANSAS, but they were not of great economic importance. Several species of blister beetles increased in abundance in INDIANA in 1961; a population rise is suggested for the next few seasons.

JAPANESE BEETLE (Popillia japonica) adults were very abundant on alfalfa in the Kingston area of Washington County, RHODE ISLAND, in late August. Losses to corn and soybeans were negligible in INDIANA. SOUTHERN CORN ROOTWORM (Diabrotica undecimpunctata howardi) populations remained generally light throughout the year on alfalfa in OKLAHOMA, and WESTERN SPOTTED CUCUMBER BEETLE (D. undecimpunctata undecimpunctata) adult counts of 2-3 per sweep were not uncommon in alfalfa in Josephine County, OREGON, in September. In CALIFORNIA, Diabrotica spp. was a local problem in alfalfa in the Salinas area of Monterey County. PALE-STRIPED FLEA BEETLE (Systena blanda) adults averaged 1-3 per sweep and caused moderate injury to several second-growth alfalfa fields in western Frederick County, MARYLAND.

ALFALFA CATERPILLAR (Colias eurytheme) was unusually abundant in the Columbia River Basin and the Yakima Valley of WASHINGTON during September; and the pest was generally abundant in alfalfa throughout OREGON, but damage was considered light in most areas. Light to medium populations of alfalfa caterpillar occurred in all alfalfa-producing areas of CALIFORNIA. Larvae became numerous in some alfalfa fields throughout southwestern IDAHO to as far east as the Grand View area of Elmore County during September. Larval counts frequently ran 10 per sweep. Heavy damage was very spotted, being most noticeable in the Grand View area and on some newly seeded alfalfa in Canyon County. Populations were below those of 1960 in NEVADA, but were heavier than normal in areas of Churchill and Clark Counties. The pest was general in UTAH, but caused only light crop injury. Alfalfa caterpillar caused some losses to alfalfa in COLORADO. The pest was a problem in some areas of the Arkansas Valley of Colorado late in the season, with 50-300 larvae per 100 sweeps. Infestations in ARIZONA began to increase in mid-August and were heavy statewide by September 1. Graham County populations were heaviest and did considerable damage in some fields. From a statewide standpoint, populations were similar to those of 1960 and were not as damaging as in some previous years. The decline this year began in the latter part of September. In NEW MEXICO, larvae began appearing in increasing numbers during May and June in southeastern area alfalfa. During the summer, damage was noticeable in many fields throughout the southern area. Alfalfa caterpillar caused light damage to legumes in TEXAS.

Relatively low numbers of alfalfa caterpillar were found feeding on legumes in MISSOURI. Adult activity was very noticeable in legumes in eastern and southeastern NEBRASKA during May and early June. Alfalfa caterpillar populations in MINNESOTA were higher than usual, but no apparent damage to alfalfa occurred. An occasional field had counts of 100 larvae per 100 sweeps. The species caused partial defoliation of legumes in southern INDIANA during September and October, and populations on alfalfa in all sections of MARYLAND were generally light throughout the season.

Larval populations of GREEN CLOVERWORM (*Plathypena scabra*) were generally higher and more widespread in DELAWARE alfalfa than in 1960. The highest numbers on alfalfa occurred during late July to mid-August. The insect was reported as generally light on legumes in MARYLAND, INDIANA, MISSOURI, KANSAS, MINNESOTA, OKLAHOMA and TEXAS. A few isolated alfalfa fields in south central and north central areas of Oklahoma had heavy populations of up to 20 per square foot, and light damage to alfalfa was noted in Texas.

BEET ARMYWORM (*Spodoptera exigua*) infestations in ARIZONA were heavy and damaging to some central and southeastern area alfalfa during late August, September and October. Counts averaged 60 per 100 sweeps in some fields during this period. In TEXAS, the pest caused light damage to legumes generally, and heavy damage to castorbeans in Brazos County. Medium populations of beet armyworm developed in Yolo and Colusa Counties, CALIFORNIA.

WESTERN YELLOW-STRIPED ARMYWORM (*Prodenia praefica*) was generally abundant in alfalfa throughout OREGON, but damage was light in most areas; and the pest was locally medium to heavy in alfalfa plantings in Kern and Fresno Counties, CALIFORNIA. It damaged a few fields of alfalfa in UTAH; and the species, along with cutworms, damaged alfalfa in the Yakima Valley area of WASHINGTON during September and October. YELLOW-STRIPED ARMYWORM (*P. ornithogalli*) was a problem on alfalfa in some areas of ARIZONA, but generally only a minor pest. It also caused light damage to alfalfa during the spring in local southern and south central areas of UTAH; less than normal, however.

GARDEN WEBWORM (*Loxostege similalis*) was a problem on alfalfa in some areas of ARIZONA, but was generally only a minor pest. In MISSOURI, a few fields of alfalfa in the southwest were also damaged, but populations of the insect over the State were low in 1961. Garden webworm caused partial defoliation of legumes in the southern area of INDIANA during September and October. The insect was not important during 1961 in KANSAS. ALFALFA WEBWORM (*L. commixtalis*) adults were numerous during the evenings of September 14-18 in the Parma-Wilder area of IDAHO. WEBWORMS (*Loxostege* spp.) were a problem in the southeastern area of PENNSYLVANIA during September on alfalfa seeded in early August. Infestations of *Loxostege* spp. were becoming common in alfalfa by late June in the southeastern and north central areas of OKLAHOMA. Generally, only light infestations existed throughout July, August and September in that State, except in localized spots in the southwest early in September.

ALFALFA LOOPER (*Autographa californica*) larvae were found feeding on alfalfa foliage in Roosevelt and Chaves Counties, NEW MEXICO, during August. Populations were low in UTAH again. FORAGE LOOPER (*Caenurgina erechtea*) adult activity was noted during late April in legume fields in eastern and southeastern NEBRASKA. The insect was not a problem during 1961 in KANSAS. CABBAGE LOOPER (*Trichoplusia ni*) was reported as a pest of forage crops in OKLAHOMA and caused light damage to legumes in TEXAS. CLOVER LOOPER (*Caenurgina crassiuscula*) caused partial defoliation of legumes in the southern area of INDIANA during September and October.

CORN EARWORM (Heliothis zea) populations were unusually high in alfalfa in Dona Ana, Chaves, De Baca and Eddy Counties, NEW MEXICO, but were only light in some alfalfa throughout the season in ARIZONA. Light damage to legumes was reported in TEXAS. Infestations in OKLAHOMA remained light in alfalfa until early July, and light to medium infestations were common (up to 1.2 per sweep) in alfalfa by early September. Activity was noted in alfalfa in the south central area until late October. Corn earworm populations in CALIFORNIA were general during the year; heavy populations did not develop until late in the year. SALT-MARSH CATERPILLAR (Estigmene acrea) was a problem on alfalfa in some areas of ARIZONA, but generally of only minor importance.

The first general outbreak of VARIEGATED CUTWORM (Peridroma saucia) since 1957 occurred in the central third of OKLAHOMA, extending from Kansas to Texas. Heavy to severe (up to 20 per square foot) infestations were consuming all of the new growth of recently mowed alfalfa in mid and late May. By late May, up to 35 percent of the infestation in some fields was parasitized. Except for localized areas in Lincoln and Muskogee Counties, populations in Oklahoma had dropped below the economic level by mid-June. Variegated cutworm was not reported to be of economic importance in 1961 in KANSAS; however, the pest did cause some losses of alfalfa in COLORADO and UTAH. Counts of small larvae in southeast MISSOURI ranged from 2 to 17 per square foot in alfalfa in early May. By mid-May, one to 21 half-grown larvae per square foot were causing extensive damage to alfalfa in this area. By early June, the larvae had become full grown in the southeast and the damage subsided. Light infestations caused some marginal damage in the northwest part of Missouri, but populations were low in all other areas of the State. There was an estimated 50 to 100 larvae under each bale of hay in Dundy County, NEBRASKA, and 3 larvae per square foot in a field of alfalfa in Keya Paha County of the same State during June. Peak moth flights in Nebraska occurred in late May at North Platte and early July in Lincoln. Variegated cutworm populations were light to medium in alfalfa in San Bernardino and Imperial Counties, CALIFORNIA, during 1961.

Spotted infestations of ARMY CUTWORM (Chorizagrotis auxiliaris) were noted in mid-May over approximately 50 acres of alfalfa near Midvale in Washington County, IDAHO. Infestations and damage were heavy in the west central counties of NEVADA on alfalfa in March. Injury was heaviest in Churchill and Douglas Counties. Army cutworm damaged alfalfa plantings in the North Desert area of San Bernardino County, CALIFORNIA, early in the year and spread over the State by midsummer. Prior to 1961, this species was not a pest in California. The pest damaged much less alfalfa during the spring in UTAH than normal, and caused some loss to alfalfa in COLORADO. Heavy, damaging populations occurred on legumes in NEBRASKA as far as the eastern third of the State during April. In some areas, larvae were found to be moving in "armies" to new fields. Scattered, heavy populations of army cutworm damaged alfalfa in several sections of NORTH DAKOTA during April and May, and it damaged alfalfa in many fields in the western two-thirds of KANSAS during the spring. In SOUTH DAKOTA, the insect was reported doing some damage to alfalfa in Perkins and Bennett Counties, with all damage reports being received in the spring. Several alfalfa fields in northern Dona Ana County, NEW MEXICO, were almost completely defoliated. Counts in heavily infested fields ran 3-16 larvae per square foot.

DINGY CUTWORM (Feltia subgothica) larvae were very light on alfalfa in the central area of NEBRASKA during late March, and DARK-SIDED CUTWORM (Euxoa messoria) caused damage to alfalfa in the southwestern part of the same State the first week of June. Several unspecified CUTWORMS caused damage to legumes in TEXAS. A PYRAUSTID (Nomophila noctuella) damaged newly seeded alfalfa in Franklin and Culpeper Counties, VIRGINIA; this is a relatively newly recognized pest in the State. A LEAF ROLLER (Platynota stultana) was generally of only minor importance in ARIZONA, but it did cause some damage to alfalfa. A TORTRICID (Tortrix pallorana) caused only local seed injury to alfalfa in UTAH, largely in Box Elder County.

FIELD CRICKETS were heavy on alfalfa and seed alfalfa in Imperial County, CALIFORNIA, and they were numerous in the eastern area of SOUTH DAKOTA during the late summer and early fall. Some damage occurred to alfalfa seed crops and to swathed grain in the latter State. In MINNESOTA, a seeding of red clover in the northwest district required treatment to prevent further injury by crickets. Early stage nymphs of Gryllus spp. became evident in late July in RHODE ISLAND. Populations were only moderate at maturity in late September.

TREE CRICKETS (Oecanthus spp.) were abundant in alfalfa and Conservation Reserve Land in the eastern area of SOUTH DAKOTA. They began to appear about the first of July and continued to increase in population until the end of that month. Counts in some fields in the northeast and north central area were up to 12 per sweep. Counts averaged 6 per 10 sweeps for the eastern portion of the State. Damage to forage crops was light.

Madrid clover in Navarro County, TEXAS, was badly stunted by infestations of COSMOPTERYGIDS (Isophrictis similiella and Walshia sp., near or miscecolorella).

Unknown species of MAGGOTS heavily infested native lupine seed pods, as well as seed pods of Oxytropis gracilis in ALASKA; both of these legumes are of potential value as forage species.

SEED CHALCIDS (Bruchophagus spp.) caused their usual economic damage in UTAH; and B. roddi Gussakovskii* was a problem on alfalfa in some areas of ARIZONA, but generally was only a minor pest.

THRIPS were unusually heavy on alfalfa in areas of Clark and Lincoln Counties, NEVADA, with heavy damage occurring in seedling and regrowth fields. Light to heavy infestations of a THRIPS (Frankliniella occidentalis) occurred in alfalfa throughout the year in ARIZONA. Damage to new growth was evident in many cases.

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) was a problem in alfalfa seed fields in Jackson County, OREGON. Several hundred acres were treated by August 20. Defoliation of plants occurred by September, but damage to the seed was slight. The mite became generally abundant on alfalfa and red clover in IDAHO from late May until late August. It was found on nearly all red clover fields sampled in the western area of the State during June. In general, populations of two-spotted spider mite were more numerous on legumes during August and September. Two-spotted spider mite also caused light injury to alfalfa and clovers in UTAH. Unspecified SPIDER MITES severely damaged several fields of alfalfa in Clark County, NEVADA, in May, and red clover in Humboldt County in June. MITES in general were prevalent on many forage crops in CALIFORNIA and, due to drought conditions and high temperatures, were active over a long period of time. Seed alfalfa suffered heavy populations in Imperial County and medium populations in Kern County. Medium populations were present on clover in seed-producing areas of Glenn and Merced Counties, and controls were required on seed clover in Tehama County. Light infestations of Tetranychus cinnabarinus were present in some areas of ARIZONA throughout the year. In Yuma County, some alfalfa seed fields were heavily damaged during July by almost complete defoliation.

CLOVER MITE (Bryobia praetiosa) was a problem on alfalfa in some areas of ARIZONA, but was generally only a minor pest in that State. Heavy local populations of clover mite occurred on clover and alfalfa in the Irvine area of Orange County, CALIFORNIA. BROWN WHEAT MITE (Petrobia latens) was present in light to moderate numbers on alfalfa in NEVADA, but severe infestations occurred on alfalfa in Churchill and Pershing Counties from April to early June in that State. All stages of an ERIOPHYID MITE (Aceria medicaginis) were found in leaf axils of alfalfa in the Walla Walla area of WASHINGTON; a new record for the State.

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* Strong, F. E. 1962. Ent. Soc. Amer. Ann. 55(1):1-4.

Soybean, Peanut and Field Pea Insects

Highlights: BEAN LEAF BEETLE adults caused economic foliage damage to soybeans in areas of Maryland and Illinois as did MEXICAN BEAN BEETLE in Georgia and Maryland. SOUTHERN CORN ROOTWORM caused considerable damage to peanuts in areas of Virginia and Georgia. Several STINK BUGS were of economic importance on peanuts and soybeans during the year. SPIDER MITES caused considerable injury to soybeans in areas of Delaware, Maryland and Virginia.

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BEAN LEAF BEETLE (Cerotoma trifurcata) adults were abundant and caused a considerable amount of foliage injury to soybeans in MARYLAND, particularly on the central Eastern Shore. Light damage to soybeans was reported in some VIRGINIA counties. Populations in ARKANSAS continued light on soybeans and relatively low numbers were found feeding on legumes in MISSOURI. In ILLINOIS, bean leaf beetle ranged 0-250 and averaged 42 adults per 100 feet of row on soybeans in the west-southwest district in mid-June and from 0-200 adults per 100 feet of row again in early August in the central, west-southwest and east-southeast districts. Much shot-holing of soybean leaves occurred in Illinois, but apparently damage was not too severe. Populations on soybeans in MINNESOTA were very low in the south central area, where the insect has been numerous in past years.

A CHRYSOMELID (Maecolaspis sp.) was rather light on soybeans in 1961 in ILLINOIS, but adults were abundant on soybeans in Frederick and Queen Annes Counties, MARYLAND, during late July; however, damage was negligible in the latter State.

MEXICAN BEAN BEETLE (Epilachna varivestis) infestations were moderate to heavy on soybeans in GEORGIA; moderate to heavy in Caroline and St. Marys Counties, MARYLAND; and caused light damage to soybeans in some VIRGINIA counties. MARGINED BLISTER BEETLE (Epicauta pestifera) was abundant and nearly defoliated soybeans in scattered spots in some ILLINOIS fields.

COWPEA CURCULIO (Chalcodermus aeneus) infestations were light to moderate on field peas in GEORGIA; COWPEA WEEVIL (Callosobruchus maculatus) caused heavy, local damage to cowpeas in Hale and the surrounding counties in the TEXAS Panhandle; and a WEEVIL (Compsus auricephalus) was collected from soybeans in the upper Arkansas River Valley of ARKANSAS. Although the latter pest was more numerous in Arkansas than during 1960, economic infestations did not develop and no acreage was treated.

SOUTHERN CORN ROOTWORM (Diabrotica undecimpunctata howardi) infested peanuts in four counties in southwestern GEORGIA; approximately 3,000 acres were involved, with damage from 10 to 90 percent (average 30 percent). This 30 percent loss amounts to $140,000. This pest has been present for a long time in Georgia, but it has only recently become a pest of peanuts. The value of the total peanut crop in the State was approximately $55,000,000. In VIRGINIA, southern corn rootworm almost totally destroyed the peanut crop in some eastern areas where controls failed or where they were not applied properly.

JAPANESE BEETLE (Popillia japonica) losses to soybeans in INDIANA were negligible in 1961. In the Newton County area, primarily rural, numbers of the pest were low except for a two-square-mile area. Here, some 200,000 larvae per acre were found in soybean land in the fall of 1960 and had a peak beetle population of 25,000 per acre in August of 1961.

VELVETBEAN CATERPILLAR (Anticarsia gemmatalis) caused some damage to peanuts during the fall in ALABAMA, as well as some damage to soybeans throughout most of the State during the same period. In GEORGIA, infestations were light to moderate on peanuts and lighter than 1960. Infestations on soybeans in Georgia were moderate to heavy. RED-NECKED PEANUTWORM (Stegasta basqueella) infestations were light on peanuts in GEORGIA, and light infestations of the insect were present generally in peanut fields in the south central and southwestern parts of OKLAHOMA. LESSER CORNSTALK BORER (Elasmopalpus lignosellus) caused light damage to peanuts in central TEXAS.

Infestations of CORN EARWORM (Heliothis zea) caused some damage to peanuts during the fall in ALABAMA, and they also caused some damage to soybeans throughout most of the State during the same period. Infestations in GEORGIA were light to moderate on peanuts and lighter than 1960, but infestations on soybeans were moderate to heavy. The species was of less importance on soybeans in ARKANSAS where it was the most important pest of soybeans in 1960. In VIRGINIA, corn earworm infestations on soybeans in the eastern area were considerably less than in the two previous years.

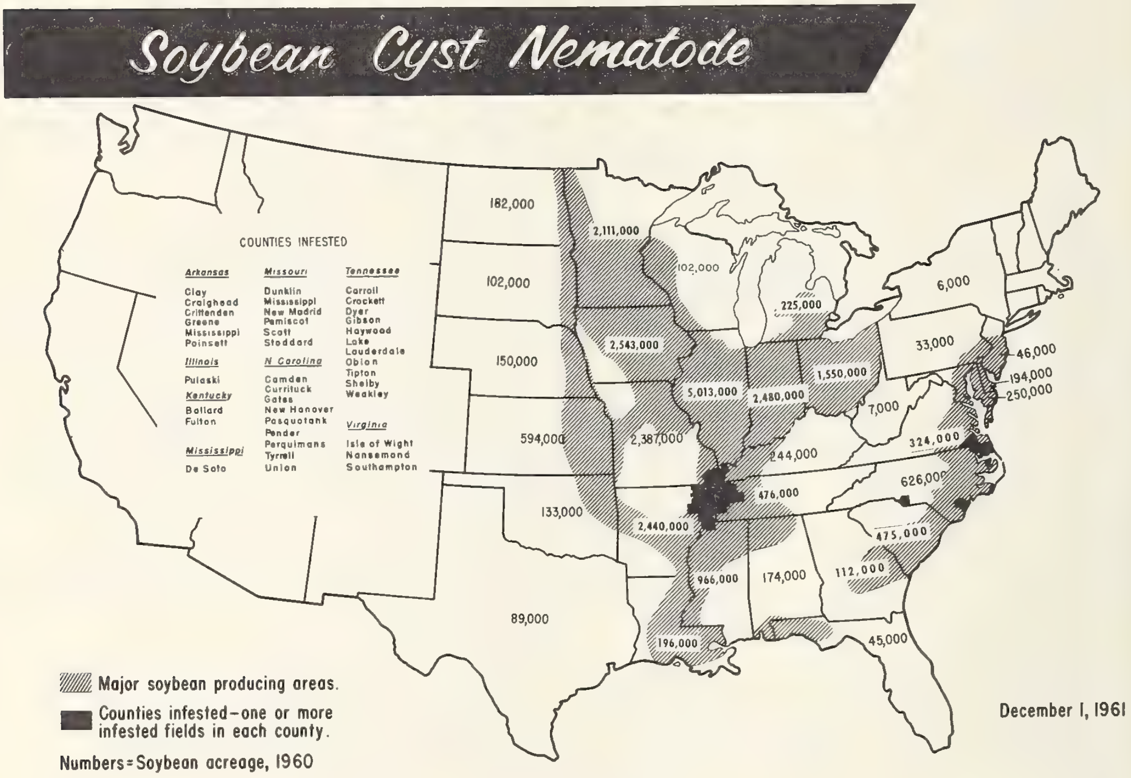
FALL ARMYWORM (Laphygma frugiperda) caused some damage to peanuts during the fall in ALABAMA, and infestations in GEORGIA were light to moderate on peanuts and lighter than in 1960. CABBAGE LOOPER (Trichoplusia ni) infestations on soybeans in GEORGIA were moderate to heavy. GREEN CLOVERWORM (Plathypena scabra) larval infestations on soybeans in DELAWARE were generally higher and more widespread than during 1960. While it was present on this crop throughout most of the season in Delaware, infestations during the first week of August ranged from light in 36 fields, to moderate in 11 fields and to heavy in 5 fields. Green cloverworm was generally light on soybeans in MARYLAND, ARKANSAS, MINNESOTA and OKLAHOMA. GRANULATE CUTWORM (Feltia subterranea) infestations were general throughout the peanut-growing area of GEORGIA, but growers were able to control the infestations before serious defoliation occurred. Infestations ranged from light to heavy in Georgia.

SOUTHERN GREEN STINK BUG (Nezara viridula) caused some damage to soybeans throughout most of ALABAMA during the fall, and infestations were light to moderate on peanuts in GEORGIA when the pods were forming and maturing. Also in Georgia, infestations of BROWN STINK BUG (Euschistus servus) were light to moderate on peanuts during same period; southern green stink bug and a BURROWING STINK BUG (Pangaeus bilineatus) were light on peanuts during the season. The infestations of the latter species were lighter in Georgia than those of 1959, which were serious on Spanish peanuts in several counties. In ARKANSAS, several species of STINK BUGS attacked soybeans. The species seem to vary between areas and even between fields. GREEN STINK BUG (Acrosternum hilare) was the most important species in Arkansas in 1961. Other species of stink bugs included southern green stink bug and Euschistus spp. Damage occurs late in the season after pods are formed, often remaining on the plants until after harvest. Stink bugs were less severe generally on soybeans, in Arkansas, than they were in 1960. THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) also continued as a pest of soybeans in Arkansas, causing some lodging of plants in 1961.

Unspecified THRIPS caused noticeable streaking of soybeans in most sections of MARYLAND, and infestations on peanuts in GEORGIA were light to heavy, with most of them moderate. Infestations were not as severe as in 1960 in Georgia. Several species of thrips caused light damage to peanuts in the central area of TEXAS, and infestations of Frankliniella sp. were common in the terminals of peanuts in the south central, southwestern and east central areas of OKLAHOMA.

STRAWBERRY SPIDER MITE (Tetranychus atlanticus) was first found in DELAWARE in numbers on soybeans in northern Sussex County on July 19; populations reached a peak by mid-August and disappeared by the first week of September. In other areas of Delaware, peak populations were not reached until the last week of August and early September. Yellowing of leaves, where populations were high, was noticeable approximately 2-3 weeks prior to peaks. SPIDER MITES, especially strawberry spider mite, were above normal in MARYLAND and caused considerable injury, with resultant defoliation of soybeans in Dorchester, Talbot and Wicomico Counties. Unspecified species of spider mites caused considerable injury to soybeans in the eastern area of VIRGINIA during August.

SOYBEAN CYST NEMATODE (Heterodera glycines) was reported in four new counties in 1961: Clay and Greene Counties, ARKANSAS, and Carroll and Weakley Counties, TENNESSEE. As of the end of the year, 1,384 properties in 39 counties in 8 states were known to be infested, involving approximately 66,300 acres. In MISSOURI, losses due to the nematode were estimated at 14.7 percent of the crop in 166 fields where damage was noted. Loss, no doubt, occurred in a number of other Missouri fields where symptoms were minor or where damage was not observed by survey personnel. The map below shows the status of the program as of December 1, 1961.



U.S DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

FIELD CRICKETS were heavy on alfalfa and seed alfalfa in Imperial County, CALIFORNIA, and they were numerous in the eastern area of SOUTH DAKOTA during the late summer and early fall. Some damage occurred to alfalfa seed crops and to swathed grain in the latter State. In MINNESOTA, a seeding of red clover in the northwest district required treatment to prevent further injury by crickets. Early stage nymphs of Gryllus spp. became evident in late July in RHODE ISLAND. Populations were only moderate at maturity in late September.

TREE CRICKETS (Oecanthus spp.) were abundant in alfalfa and Conservation Reserve Land in the eastern area of SOUTH DAKOTA. They began to appear about the first of July and continued to increase in population until the end of that month. Counts in some fields in the northeast and north central area were up to 12 per sweep. Counts averaged 6 per 10 sweeps for the eastern portion of the State. Damage to forage crops was light.

Madrid clover in Navarro County, TEXAS, was badly stunted by infestations of COSMOPTERYGIDS (Isophrictis similiella and Walshia sp., near or miscecolorella).

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TWO-SPOTTED SPIDER MITE (Tetranychus telarius) was a problem in alfalfa seed fields in Jackson County, OREGON. Several hundred acres were treated by August 20. Defoliation of plants occurred by September, but damage to the seed was slight. The mite became generally abundant on alfalfa and red clover in IDAHO from late May until late August. It was found on nearly all red clover fields sampled in the western area of the State during June. In general, populations of two-spotted spider mite were more numerous on legumes during August and September. Two-spotted spider mite also caused light injury to alfalfa and clovers in UTAH. Unspecified SPIDER MITES severely damaged several fields of alfalfa in Clark County, NEVADA, in May, and red clover in Humboldt County in June. MITES in general were prevalent on many forage crops in CALIFORNIA and, due to drought conditions and high temperatures, were active over a long period of time. Seed alfalfa suffered heavy populations in Imperial County and medium populations in Kern County. Medium populations were present on clover in seed-producing areas of Glenn and Merced Counties, and controls were required on seed clover in Tehama County. Light infestations of Tetranychus cinnabarinus were present in some areas of ARIZONA throughout the year. In Yuma County, some alfalfa seed fields were heavily damaged during July by almost complete defoliation.

CLOVER MITE (Bryobia praetiosa) was a problem on alfalfa in some areas of ARIZONA, but was generally only a minor pest in that State. Heavy local populations of clover mite occurred on clover and alfalfa in the Irvine area of Orange County, CALIFORNIA. BROWN WHEAT MITE (Petrobia latens) was present in light to moderate numbers on alfalfa in NEVADA, but severe infestations occurred on alfalfa in Churchill and Pershing Counties from April to early June in that State. All stages of an ERIOPHYID MITE (Aceria medicaginis) were found in leaf axils of alfalfa in the Walla Walla area of WASHINGTON; a new record for the State.

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* Strong, F. E. 1962. Ent. Soc. Amer. Ann. 55(1):1-4.

Soybean, Peanut and Field Pea Insects

Highlights: BEAN LEAF BEETLE adults caused economic foliage damage to soybeans in areas of Maryland and Illinois as did MEXICAN BEAN BEETLE in Georgia and Maryland. SOUTHERN CORN ROOTWORM caused considerable damage to peanuts in areas of Virginia and Georgia. Several STINK BUGS were of economic importance on peanuts and soybeans during the year. SPIDER MITES caused considerable injury to soybeans in areas of Delaware, Maryland and Virginia.

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BEAN LEAF BEETLE (Cerotoma trifurcata) adults were abundant and caused a considerable amount of foliage injury to soybeans in MARYLAND, particularly on the central Eastern Shore. Light damage to soybeans was reported in some VIRGINIA counties. Populations in ARKANSAS continued light on soybeans and relatively low numbers were found feeding on legumes in MISSOURI. In ILLINOIS, bean leaf beetle ranged 0-250 and averaged 42 adults per 100 feet of row on soybeans in the west-southwest district in mid-June and from 0-200 adults per 100 feet of row again in early August in the central, west-southwest and east-southeast districts. Much shot-holing of soybean leaves occurred in Illinois, but apparently damage was not too severe. Populations on soybeans in MINNESOTA were very low in the south central area, where the insect has been numerous in past years.

A CHRYSOMELID (Maecolaspis sp.) was rather light on soybeans in 1961 in ILLINOIS, but adults were abundant on soybeans in Frederick and Queen Annes Counties, MARYLAND, during late July; however, damage was negligible in the latter State.

MEXICAN BEAN BEETLE (Epilachna varivestis) infestations were moderate to heavy on soybeans in GEORGIA; moderate to heavy in Caroline and St. Marys Counties, MARYLAND; and caused light damage to soybeans in some VIRGINIA counties. MARGINED BLISTER BEETLE (Epicauta pestifera) was abundant and nearly defoliated soybeans in scattered spots in some ILLINOIS fields.

COWPEA CURCULIO (Chalcodermus aeneus) infestations were light to moderate on field peas in GEORGIA; COWPEA WEEVIL (Callosobruchus maculatus) caused heavy, local damage to cowpeas in Hale and the surrounding counties in the TEXAS Panhandle; and a WEEVIL (Compsus auricephalus) was collected from soybeans in the upper Arkansas River Valley of ARKANSAS. Although the latter pest was more numerous in Arkansas than during 1960, economic infestations did not develop and no acreage was treated.

SOUTHERN CORN ROOTWORM (Diabrotica undecimpunctata howardi) infested peanuts in four counties in southwestern GEORGIA; approximately 3,000 acres were involved, with damage from 10 to 90 percent (average 30 percent). This 30 percent loss amounts to $140,000. This pest has been present for a long time in Georgia, but it has only recently become a pest of peanuts. The value of the total peanut crop in the State was approximately $55,000,000. In VIRGINIA, southern corn rootworm almost totally destroyed the peanut crop in some eastern areas where controls failed or where they were not applied properly.

JAPANESE BEETLE (Popillia japonica) losses to soybeans in INDIANA were negligible in 1961. In the Newton County area, primarily rural, numbers of the pest were low except for a two-square-mile area. Here, some 200,000 larvae per acre were found in soybean land in the fall of 1960 and had a peak beetle population of 25,000 per acre in August of 1961.

VELVETBEAN CATERPILLAR (Anticarsia gemmatalis) caused some damage to peanuts during the fall in ALABAMA, as well as some damage to soybeans throughout most of the State during the same period. In GEORGIA, infestations were light to moderate on peanuts and lighter than 1960. Infestations on soybeans in Georgia were moderate to heavy. RED-NECKED PEANUTWORM (Stegasta basqueella) infestations were light on peanuts in GEORGIA, and light infestations of the insect were present generally in peanut fields in the south central and southwestern parts of OKLAHOMA. LESSER CORNSTALK BORER (Elasmopalpus lignosellus) caused light damage to peanuts in central TEXAS.

Infestations of CORN EARWORM (Heliothis zea) caused some damage to peanuts during the fall in ALABAMA, and they also caused some damage to soybeans throughout most of the State during the same period. Infestations in GEORGIA were light to moderate on peanuts and lighter than 1960, but infestations on soybeans were moderate to heavy. The species was of less importance on soybeans in ARKANSAS where it was the most important pest of soybeans in 1960. In VIRGINIA, corn earworm infestations on soybeans in the eastern area were considerably less than in the two previous years.

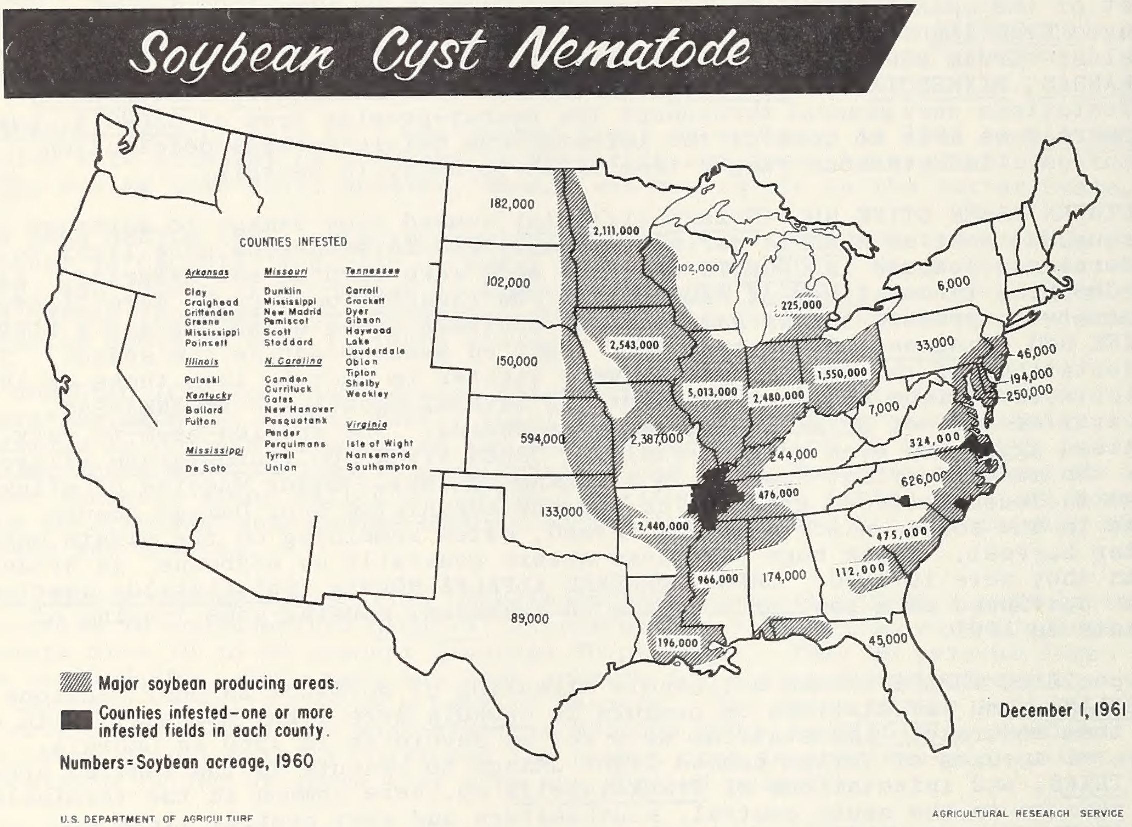
FALL ARMYWORM (Laphygma frugiperda) caused some damage to peanuts during the fall in ALABAMA, and infestations in GEORGIA were light to moderate on peanuts and lighter than in 1960. CABBAGE LOOPER (Trichoplusia ni) infestations on soybeans in GEORGIA were moderate to heavy. GREEN CLOVERWORM (Plathypena scabra) larval infestations on soybeans in DELAWARE were generally higher and more widespread than during 1960. While it was present on this crop throughout most of the season in Delaware, infestations during the first week of August ranged from light in 36 fields, to moderate in 11 fields and to heavy in 5 fields. Green cloverworm was generally light on soybeans in MARYLAND, ARKANSAS, MINNESOTA and OKLAHOMA. GRANULATE CUTWORM (Feltia subterranea) infestations were general throughout the peanut-growing area of GEORGIA, but growers were able to control the infestations before serious defoliation occurred. Infestations ranged from light to heavy in Georgia.

SOUTHERN GREEN STINK BUG (Nezara viridula) caused some damage to soybeans throughout most of ALABAMA during the fall, and infestations were light to moderate on peanuts in GEORGIA when the pods were forming and maturing. Also in Georgia, infestations of BROWN STINK BUG (Euschistus servus) were light to moderate on peanuts during same period; southern green stink bug and a BURROWING STINK BUG (Pangaeus bilineatus) were light on peanuts during the season. The infestations of the latter species were lighter in Georgia than those of 1959, which were serious on Spanish peanuts in several counties. In ARKANSAS, several species of STINK BUGS attacked soybeans. The species seem to vary between areas and even between fields. GREEN STINK BUG (Acrosternum hilare) was the most important species in Arkansas in 1961. Other species of stink bugs included southern green stink bug and Euschistus spp. Damage occurs late in the season after pods are formed, often remaining on the plants until after harvest. Stink bugs were less severe generally on soybeans, in Arkansas, than they were in 1960. THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) also continued as a pest of soybeans in Arkansas, causing some lodging of plants in 1961.

Unspecified THRIPS caused noticeable streaking of soybeans in most sections of MARYLAND, and infestations on peanuts in GEORGIA were light to heavy, with most of them moderate. Infestations were not as severe as in 1960 in Georgia. Several species of thrips caused light damage to peanuts in the central area of TEXAS, and infestations of Frankliniella sp. were common in the terminals of peanuts in the south central, southwestern and east central areas of OKLAHOMA.

STRAWBERRY SPIDER MITE (Tetranychus atlanticus) was first found in DELAWARE in numbers on soybeans in northern Sussex County on July 19; populations reached a peak by mid-August and disappeared by the first week of September. In other areas of Delaware, peak populations were not reached until the last week of August and early September. Yellowing of leaves, where populations were high, was noticeable approximately 2-3 weeks prior to peaks. SPIDER MITES, especially strawberry spider mite, were above normal in MARYLAND and caused considerable injury, with resultant defoliation of soybeans in Dorchester, Talbot and Wicomico Counties. Unspecified species of spider mites caused considerable injury to soybeans in the eastern area of VIRGINIA during August.

SOYBEAN CYST NEMATODE (Heterodera glycines) was reported in four new counties in 1961: Clay and Greene Counties, ARKANSAS, and Carroll and Weakley Counties, TENNESSEE. As of the end of the year, 1,384 properties in 39 counties in 8 states were known to be infested, involving approximately 66,300 acres. In MISSOURI, losses due to the nematode were estimated at 14.7 percent of the crop in 166 fields where damage was noted. Loss, no doubt, occurred in a number of other Missouri fields where symptoms were minor or where damage was not observed by survey personnel. The map below shows the status of the program as of December 1, 1961.



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